VOLUME 20 / NUMBER 2
JANUARY 23, 1982
ACC. NOS. N82-11013 to N82-12026

STAR

AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P. O. Box 8757, B. W. I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C., 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 20, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through March 31, 1982.

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR* and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, consveration, oceanography, environmental protection, urban transportation, and other topics of high national priority are covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P. O. Box 8757, B. W. I. Airport, Maryland 21240.

HOW TO USE STAR SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche[1] are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($6.00 domestic; $12.00 foreign). Microfiche are sold at price code A01 ($4.00 domestic; $8.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services, in addition to the distribution of NASA scientific and technical reports and of *STAR* and its cumulative indexes, is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;

2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
Attn.: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF STAR ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $50.00 North America; $100.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B. W. I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-- 1/	-- 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E99 Write for quote		
N01	30.00	45.00

VOLUME 20 NUMBER 2 JANUARY 23, 1982

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 141

02 AERODYNAMICS 143

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

03 AIR TRANSPORTATION AND SAFETY 146

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 146

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 147

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION 149

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER 149

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL 150

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 153

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*.

12 ASTRONAUTICS (GENERAL) 154

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS N.A.

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 154

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES 155

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION N.A.

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING 156

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 156

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

19 SPACECRAFT INSTRUMENTATION N.A.
For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER 157
Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.
For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 157
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 158
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 161
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics*.

26 METALLIC MATERIALS 167
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 170
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 173
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion*.

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics*.

31 ENGINEERING (GENERAL) 181
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 188
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking*.

33 ELECTRONICS AND ELECTRICAL ENGINEERING 191
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

34 FLUID MECHANICS AND HEAT TRANSFER 195
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

35 INSTRUMENTATION AND PHOTOGRAPHY 202
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation*.

36 LASERS AND MASERS 204
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 206
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 209
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 209
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences*.

42 GEOSCIENCES (GENERAL) N.A.

43 EARTH RESOURCES 213
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography*.

44 ENERGY PRODUCTION AND CONVERSION 218
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation*.

45 ENVIRONMENT POLLUTION 228
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 235
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation*.

47 METEOROLOGY AND CLIMATOLOGY 241
Includes weather forecasting and modification.

48 OCEANOGRAPHY 245
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes life sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) 246
Includes genetics.

52 AEROSPACE MEDICINE 247
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES N.A.
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT 249
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY N.A.
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) N.A.

60 COMPUTER OPERATIONS AND HARDWARE 251
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering*.

61 COMPUTER PROGRAMMING AND SOFTWARE 252
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS 255
Includes computer networks.

63 CYBERNETICS 255
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support*.

64 NUMERICAL ANALYSIS 255
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 257
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS 258
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS 259
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering*.

70 PHYSICS (GENERAL) 259
For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar Physics*.

71 ACOUSTICS 260
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution*.

72 ATOMIC AND MOLECULAR PHYSICS 261
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS 265
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation*.

74 OPTICS 267
Includes light phenomena.

75 PLASMA PHYSICS 269
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

76 SOLID-STATE PHYSICS 274
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

77 THERMODYNAMICS AND STATISTICAL PHYSICS 277
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) N.A.
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 277
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 278
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software*.

83 ECONOMICS AND COST ANALYSIS 279
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE 279
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION 279
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences*.

88 SPACE SCIENCES (GENERAL) N.A.

89 ASTRONOMY 280
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 282
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 282
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

92 SOLAR PHYSICS 283
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 284
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

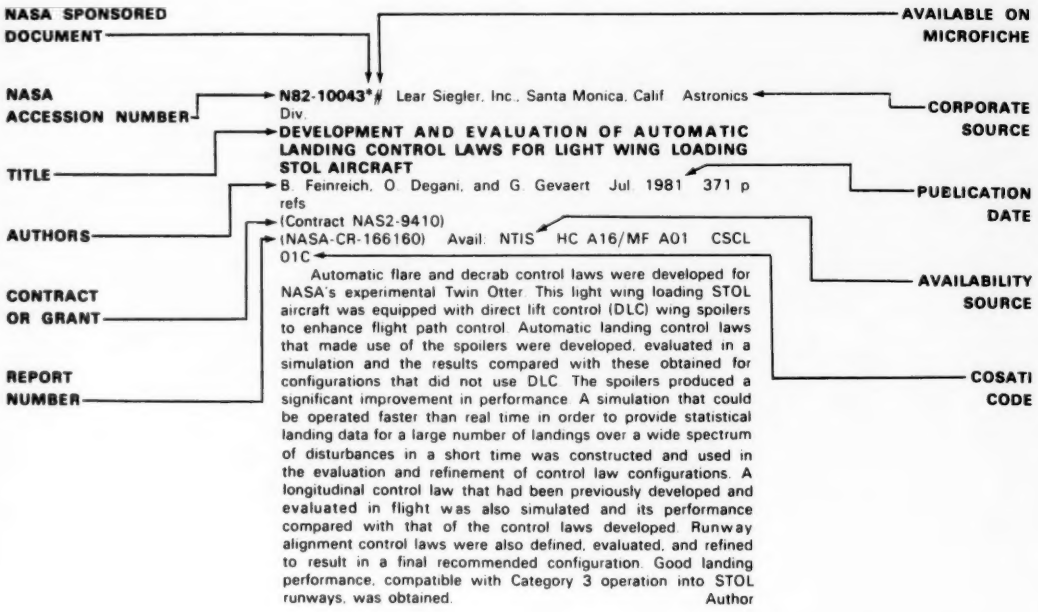
GENERAL

99 GENERAL 284

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX I-1
PERSONAL AUTHOR INDEX I-65
CORPORATE SOURCE INDEX I-73
CONTRACT NUMBER INDEX I-89
REPORT/ACCESSION NUMBER INDEX I-93

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
CORPORATE SOURCE
TITLE
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
AUTHORS
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Contract NAS2-9410)
REPORT NUMBER
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C
AVAILABILITY SOURCE
COSATI CODE
Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

VOLUME 20 NUMBER 2/JANUARY 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-11013*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF VORTEX FLAPS ON THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF AN ARROW WING
Long P. Yip and Daniel G. Murri Nov. 1981 64 p refs (NASA-TP-1914; L-14575) Avail: NTIS HC A04/MF A01 CSCL 01B

Tests were conducted in the Langley 12-foot low-speed wind-tunnel to determine the longitudinal and lateral-directional aerodynamic effects of plain and tabbed vortex flaps on a flat-plate, highly swept arrow-wing model. Flow-visualization studies were made using a helium-bubble technique. Static forces and moments were measured over an angle-of-attack range from 0 deg to 50 deg for sideslip angles of 0 deg and + or - 4 deg. A.R.H.

N82-11014# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technol. Div.
ACTA MECHANICA SINICA
11 Sep. 1981 47 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 70-73
(AD-A105184; FTD-ID(RS)T-0704-81) Avail: NTIS HC A03/MF A01 CSCL 01/2

Various fluid dynamics problems are discussed including the computation of three-dimensional flow in turbomachinery, the design of wing root regions of aircraft wing-body combinations, and the diffraction and reflection of traveling shock waves. For individual titles, see N82-11015 through N82-11017.

N82-11015# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ARBITRARY QUASI-ORTHOGONAL SURFACE METHOD FOR COMPUTING THREE-DIMENSIONAL FLOW IN TURBINE MACHINERY. 2. CALCULATION OF THE THREE-DIMENSIONAL FLOW WITH THE S SUB 1-SURFACE TWISTED **c07**
Xin Xiao-Kang, Jiang Jin-Liang, and Zhu Shi-Can *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 1-19 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

On the basis of the quasi-orthogonal surface method, a three-dimensional flow field solution of inviscous fluids in turbine machinery is obtained. This method, under the condition allowed by the storage of the computer, can calculate any shapes of S sub 1 and S sub 2 surfaces (including twisting S sub 1 surfaces) and obtain the shapes of space streamlines and the three-dimensional distribution of parameters such as velocity. The calculations for the two conditions of a centrifugal compressor with a small impeller (phi 110) indicate the relative value of the twist of the S sub 1 surface is about 3 to 10 percent. The S sub 1 surface shows a double twist like a twist drill from the inlet to the outlet. M.G.

N82-11016# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PRINCIPLES AND METHODS FOR SHAPING THE WING ROOT REGIONS OF A WING-BODY COMBINATION AT TRANSONIC AND LOWER SUPERSONIC SPEEDS **c05**
Yang Tso Sheng, Tai Chia Tsun, Chen Ching Sung, and Fan I. Chia *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 20-35 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

The principles and methods for the combined shaping of the wing root regions of a wing-body combination, in accordance with the requirements of area rule and shockless pressure field, are discussed. It is shown that the favorable non-midwing arrangement is able to reduce the amount of fuselage shaping required for the reduction of the zero lift wave drag of a wing-body combination. The combined shaping so designed may thus be realized more easily in structural arrangement. M.G.

N82-11017# Joint Publications Research Service, Arlington, Va. Foreign Technology Div.
THE WAVE DIAGRAMS FOR DIFFRACTION AND REFLECTION OF A TRAVELING WEAK SHOCK WAVE FROM AN OPEN END OF A SHOCK TUBE **c02**
Wei Chung Lei, Wang Ping-Cheng, and Chang Chun Hsiu *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 36-44 Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

The free diffractions of a weak shock wave issuing from an open end of a shock tube and the formation and development of a vortex ring from the end of the tube were observed by a Schlieren method. Also observed were the oblique reflections from the horizontal floor and the vertical plate. As the wave impinges on the horizontal surface near grazing incidence, the Mach stem forms. Under certain conditions, when this Mach stem travels along a slanted surface with an incidence angle which is larger than the critical value with respect to the horizontal axis, the phenomenon of 'dissolution' of the Mach stem occurs. In this phenomenon the incident wave and the reflected wave travel separately along the slanted surface. M.G.

N82-11018*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ALGORITHM FOR FUEL CONSERVATIVE HORIZONTAL CAPTURE TRAJECTORIES
Frank Neuman and Heinz Erzberger Oct. 1981 31 p refs (NASA-TM-81334; A-8746) Avail: NTIS HC A03/MF A01 CSCL 01B

A real time algorithm for computing constant altitude fuel-conservative approach trajectories for aircraft is described. The characteristics of the trajectory computed were chosen to approximate the extremal trajectories obtained from the optimal control solution to the problem and showed a fuel difference of only 0.5 to 2 percent for the real time algorithm in favor of the extremals. The trajectories may start at any initial position, heading,

and speed and end at any other final position, heading, and speed. They consist of straight lines and a series of circular arcs of varying radius to approximate constant bank-angle decelerating turns. Throttle control is maximum thrust, nominal thrust, or zero thrust. Bank-angle control is either zero or aproximately 30 deg. M.G.

N82-11019# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ACTA MECHANICA SINICA (SELECTED ARTICLES)
15 Sep. 1981 47 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979
(AD-A105636; FTD-ID(RS)T-0706-81) Avail: NTIS HC A03/MF A01 CSCL 01/2

Various techniques for the analysis of nozzle flows are addressed. Specifically, compression processes in hypersonic gun tunnels, turbulent boundary layer separation with gas inlet ducts, and transonic flow characteristics in Laval nozzles are considered. For individual titles, see N82-11020 through N82-11022.

N82-11020# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON TRANSONIC FLOW IN HYPERBOLIC LAVAL NOZZLES **c02**
Jia Zhen-xue and Lin Tong-ji *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 1-18 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

Transonic flow in the throat region of hyperbolic Laval nozzles is analyzed using the conformal curvilinear coordinate method. A solution to this type flow is given for the cases of different radii of wall curvature at the throat and different values of the ratio of the specific heats. The general behavior of the transonic flow and Mach number distribution in the throat region are presented. It can be applied to the design of nozzles, especially, in the design of aerodynamic laser nozzles. J.M.S.

N82-11021# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPRESSION PROCESSES OF FREE PISTONS AFTER THE OPENING OF NOZZLE IN A HYPERSONIC GUN TUNNEL **c02**
Qian Fu-xing, Xiao Lin-kui, and Shi Zhen-ping *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 19-36 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 Presented at the 1st Natl. Shock Wave Conf., 12 Nov. 1978 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

Compression processes of free pistons after opening the nozzle in a hypersonic gun tunnel are addressed. The nozzle flow starts at the time when the primary shock running ahead of the piston reaches the diaphram at the entrance of the nozzle and the piston starts to decelerate at the time when the shock reflected from the nozzle strikes it. The momentum equation for the motion of the piston and the continuity equation of mass of the gas are derived respectively, and the finite difference calculations are carried out using computers. According to the results obtained, piston deceleration, overrush, rebound, oscillations, equilibrium running, and peak pressure are discussed for various given initial conditions. It is shown that compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel are significantly different from those for a closed nozzle. The results are compared with those obtained with equilibrium technique based on closed nozzle and with some experimental data, and furnish important information for the operation of hypersonic gun tunnels. J.M.S.

N82-11022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PREDICTION OF TURBULENT BOUNDARY LAYER SEPARATION **c34**
Wu Guo-chuan *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 37-44 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

Theoretical, analytical predictions and experimental results concerning turbulent boundary layer separation are presented. The results indicate that the occurrence of boundary layer separation can be predicted based on the variation of velocity in the main flow region. The analysis presented provides a basis for the design of gas inlet ducts with good flow characteristics and small stagnation pressure loss. Also, it can predict the quality of the gas inlet duct already designed. J.M.S.

N82-11023*# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
JOURNAL OF ENGINEERING THERMOPHYSICS (SELECTED ARTICLES)
16 Sep. 1981 79 p refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 p 20-42, 46-52, 73-75, 89-91
(AD-A105604; FTD-ID(RS)T-0570-81) Avail: NTIS HC A05/MF A01 CSCL 21/5

Inlet and cascade flow in turbocompressors, internal blade cooling in gas turbine engines, turbulent aerodynamic heating, and recirculating flow in the wake of flow stabilizers are considered. For individual titles, see N82-11024 through N82-11028.

N82-11024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THEORETICAL INVESTIGATIONS AND EXPERIMENTAL RESEARCHES FOR HIGHER SUBSONIC TWO-DIMENSIONAL COMPRESSOR CASCADE **c07**
Yan Ru-qun and Qian Zhao-yan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Thermophys. Eng. Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

Compressible turbulence flow boundary layer theory and several characteristic boundary layer parameters (momentum thickness, form factors, energy factors and other combinational parameters) were combined with simplified gas flow speed distributions in the boundary layers in the wake behind the blade cascade and used to deduce, on the basis of the research foundation accumulated in the past about the theory of blade cascade losses, a simplified equation for the calculation of total two-dimensional blade cascade pressure losses for subsonic and transonic speeds. With this equation, it is possible to calculate the two-dimensional blade cascade pressure losses in designed operational configurations and off-designed operational configurations. A graphical method for determining the corrected gas compressibility effect in the blade cascade of compressors under operating conditions involving higher subsonic and transonic speeds is also introduced. A.R.H.

N82-11025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A THEORETICAL ANALYSIS OF THE STREAM SURFACE OF REVOLUTION WITH SUPERSONIC INLET FLOW IN A TRANSONIC AXIAL COMPRESSOR **c07**
Xu Jian-zhong, Jiang Zuo-ren, Yang Jin-sheng, Zhang Ying, and Du Zhuan-she *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. and Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

Changes in the gas flow velocity triangle behind the shock waves being considered were studied in an effort to analyze the effect which shock waves have on gas flow. A planar oblique relationship formula was used to deduce the corresponding values of changes in velocity moment, pressure losses, and total pressure ratios. This explains the important phenomenon involved when the supersonic intake cross section shock waves of transonic compressors cause addition pressurization of gas flow (supercharging). Aerodynamic and thermodynamic analyses and calculations were then carried out on the tip cross sections of the rotors. The characteristic curve calculations for the shock waves in front of the blade cascades and for the intake areas of these

cascades are examined. Passageway shock waves are also calculated. Results are discussed. A.R.H.

N82-11026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A PRIMARY RESEARCH ON ABLATION EXPERIMENT TECHNIQUE OF THE TURBULENT FLOW OVER A FLAT PLATE SPECIMEN **c02**
Han Yin-da, Wang Ke-xiang, and Yu Guang-rong *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 51-64 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Qui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

A method utilizing a flat plate specimen placed at a small angle to a supersonic arc heated flow was developed to study ablation under turbulent flow conditions. The technique can surmount the disadvantages of the usual pipe test method. Its observable recession rate is relatively uniform, and surface temperature and radiant heat flux can be easily performed. The experiment principles, the configuration of the facility, measurement and theoretical calculating method of the parameters are presented. Measured reservoir pressures ranging from 10.2 to 17.3 k/sq cm and total enthalpies from 520 to 2440 keal/kg. were accomplished. Under five turbulent conditions the ablation test result teflon models are given. A.R.H.

N82-11027# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A NEW METHOD OF COOLING TURBINE VANES **c07**
Gu Wei-zao, Zhang Yu-ming, and Xu Hong-kun *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 65-71 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhoy, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

The combined use of an internal cooling process with strengthened blades and of additives to lessen heat transfer to the blades from fuel gasses is proposed as a means of increasing intake temperature in aircraft turbine engines. Topics covered include coarseness-strengthened heat exchange in the inner passageways of blades and the precipitation of silicon dioxide particles in fuel gases onto blade surfaces. Temperature calculations made for the first stage guide vanes of the MK202 engine are included. A.R.H.

N82-11028# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RESEARCH ON THE RECIRCULATING FLOW RATE IN THE WAKE OF TWO-DIMENSIONAL FLAME STABILIZERS (UNDER COLD CONDITIONS) **c02**
Zhana Qing-fan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81 16 Sep. 1981 p 72-76 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

On the basis of a jet flow theory it is possible to deduce an equation representing the relationship flow. To measure the parameters of the reflex area in a cold condition, the dimensions of the transparent passage are 100 x 150 sq mm. The length of the stabilizer device is 100 mm. The average flow speed in front of the stabilizer device is 34m/s. By the use of the normal pressure values and round dish investigation techniques, the reflux flow area total static pressure and the reflux flow introduced in the lower sections can be determined to be the largest amounts of reflux flow in the center cross sections. The experimental results for three types of blockage ratios and three types of stabilizer devices are presented. A.R.H.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-11029 Royal Aircraft Establishment, Bedford (England). Library.
THE COMPARISON BETWEEN THE UNSTEADY PRESSURE FIELDS CALCULATED AND MEASURED ON THE ZKP MODEL
M. Couston, J. J. Angelini, and J. P. Meurzec Nov. 1980 29 p refs Transl. into ENGLISH from AGARD Conf. Rept. No. 688, 1980 Presented at the 50th Meeting of AGARD Struct. and Materials Panel, Athens, Greece, Apr. 1980
(RAE-Lib-Trans-2061; BR78139) Copyright. Avail: Issuing Activity

The unsteady pressure fields prediction for a supercritical wing is considered from a two-dimensional nonlinear method corrected for three dimensional interactions between strips using an asymptotic approximation. This approximation is derived for wings with large aspect ratio and low sweep angle. An application of this method to a real case, that is the unsteady experiment carried out with oscillation of the control surface on a rigid model in the S1-Modane transonic wind-tunnel, is described. T.M.

N82-11030# Royal Aircraft Establishment, Bedford (England).
SOME FEATURES OF FLOW PAST SLOTTED WINGS
A. V. Petrov Nov. 1980 10 p refs Transl. into ENGLISH from Uch. Zap. TsAGI (USSR), v. 8, no. 6, 1977 p 119-124 (RAE-Lib-Trans-2050; BR-77840) Copyright. Avail: Issuing Activity

The results are presented for a wide range of variation in the maximum relative curvature of the slotted profile (f sub max = 0.1 to 0.3), angle of incidence (alpha = 0 to 40 deg) and Reynolds number (Re = 0.5 x 10 to the sixth power to 1.55 x 10 the sixth power). Features of the development of viscous wakes behind elements of the slotted wing were apparent; the presence was discovered of local regions of return flow, both at the surface of the wing and beyond it within the wakes of the upstream elements. Changes are shown in the configuration of the regions of return flow depending on the angle of incidence, the angle of deflection of the double-slotted flap and on the Reynolds number. A relationship is established between the characteristics of the change in the lifting properties of the slotted wing and the development of regions of return flow. T.M.

N82-11031*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
ANALYTICAL AND EXPERIMENTAL STUDY OF FLOW PHENOMENA IN NONCAVITATING ROCKET PUMP INDUCERS Final Report
B. Lakshminarayana Washington NASA Oct. 1981 104 p refs
(Grant NGL-39-009-007)
(NASA-CR-3471; PSU-TURBO-R81-3) Avail: NTIS HC A06/MF A01 CSCL 01A

The flow processes in rocket pump inducers are summarized. The experimental investigations were carried out with air as the test medium. The major characteristics features of the rocket pump inducers are low flow coefficient (0.05 to 0.2) large stagger angle (70 deg to 85 deg) and high solidity blades of little or no camber. The investigations are concerned with the effect of viscosity not the effects of cavitation. Flow visualization, conventional and hot wire probe measurement inside and at the exit of the blade passage, were the analytical methods used. The experiment was carried out using four three and two bladed inducers with cambered blades. Both the passage and the exit flow were measured. The basic research and boundary layer investigation was carried out using a helical flat plate (of some dimensions as the inducer blades tested), and flat plate helical inducer (four bladed). Detailed mean and turbulence flow field inside the passage as well as the exit of the rotor were derived from these measurement. The bouaandary layer, endwall, and

other passage data reveal extremely complex nature of the flow, with major effects of viscosity present across the entire passage. Several analyses were carried out to predict the flow field in inducers. These included an approximate analysis, the shear pumping analysis, and a numerical solution of exact viscous equations with approximate modeling for the viscous terms. S.L.

N82-11032*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOME OBSERVATIONS ON A NEW NUMERICAL METHOD FOR SOLVING NAVIER-STOKES EQUATIONS
Ajay Kumar Nov. 1981 19 p refs
(NASA-TP-1934; L-14746) Avail: NTIS HC A02/MF A01 CSCL 01A

An explicit-implicit technique for solving Navier-Stokes equations is described which, is much less complex than other implicit methods. It is used to solve a complex, two-dimensional, steady-state, supersonic-flow problem. The computational efficiency of the method and the quality of the solution obtained from it at high Courant-Friedrich-Lewy (CFL) numbers are discussed. Modifications are discussed and certain observations are made about the method which may be helpful in using it successfully. A.R.H.

N82-11033*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL RESULTS FOR A MODIFIED 17-PERCENT-THICK LOW-SPEED AIRFOIL SECTION
Robert J. McGhee and William D. Beasley Nov. 1981 87 p refs
(NASA-TP-1919; L-14666) Avail: NTIS HC A05/MF A01 CSCL 01A

Wind-tunnel tests were conducted in the Langley low-turbulence pressure tunnel to evaluate the effects on performance of modifying a 17-percent-thick low-speed airfoil. The airfoil contour was altered to reduce the pitching-moment coefficient by increasing the forward loading and to increase the climb lift-drag ratio by decreasing the aft upper surface pressure gradient. The tests were conducted over a Mach number range from 0.07 to 0.32, a chord Reynolds number range 1.0 x 10 to the 6th power to 12.0 x 10 to the 6th power, and an angle-of-attack range from about -10 deg to 20 deg. Author

N82-11034# National Aerospace Lab., Tokyo (Japan).
NEW ESTIMATION METHOD FOR FLUTTER OR DIVERGENCE BOUNDARY FROM RANDOM RESPONSES AT SUBCRITICAL SPEEDS
Yuji Matsuzaki and Yasukatsu Ando Apr. 1981 15 p refs
(NAL-TR-667T; ISSN-0389-4-10) Avail: NTIS HC A02/MF A01

A new technique for estimating the flutter or divergence boundary from responses due to turbulence at subcritical speeds is described. The boundary can be predicted without estimating or measuring the dampings and frequencies of the aeroelastic modes. The sampled time response is modeled by the mixed autoregressive moving average process. The orders and coefficients of both autogressive and moving average parts of the process are determined with the aid of Akaike's estimation procedure. The stability boundary is estimated by using Jury's stability determinants which are expressed in terms of the autogressive coefficients alone. The modal frequencies and dampings are also evaluated from the coefficients. The technique proposed has been applied with success to signals from a cantilever wing model tested in a low supersonic flow. Comparison between the actual and estimated flutter boundaries shows that an accurate estimation can be made from data obtained in a narrow range of the dynamic pressure which is sufficiently below the boundary. Author

N82-11035# National Aerospace Lab., Tokyo (Japan). First Airframe Div.
A STUDY ON NUMERICAL METHOD FOR EVALUATING SPANWISE INTEGRAL IN SUBSONIC LIFTING-SURFACE THEORY
Teruo Ichikawa Mar. 1981 22 p refs
(NAL-TR-661T; ISSN-3989-4010) Avail: NTIS HC A02/MF A01

Two disputable points are discussed. The first point is the coincidence of each collocation section with one of the spanwise integration points. The second point is the relatively small, but undesirable, sharp variation of the regularized influence functions near the collocation sections. Two proposals for coping with these difficulties are made. Their effects are examined by computing the downwash at the surface of a steady rectangular wing subjected to a simple wing loading. It is shown that method 1, which avoids the coincidence, makes it possible, with no losses in accuracy, to greatly reduce the computing time in cases of oscillating wings. Further, it is shown that remarkable improvement in convergence with respect to the number of spanwise integration points is obtained by method 2 which distributes the spanwise integration points densely only near the collocation sections. T.M.

N82-11036# College of Aeronautics, Cranfield (England).
A WAKE SOURCE MODEL FOR ASYMMETRIC POTENTIAL FLOW PAST BODIES OF WEDGE SHAPE
P. A. T. Christopher and I. Wolton Oct. 1981 55 p refs
(C-of-A-Memo-8112) Avail: NTIS HC A04/MF A01

The wake source model of Parkinson & Jandali was generalized in several ways to accommodate the lack of symmetry and the experimentally observed difference in base pressure at the points of flow separation. A basic indeterminacy is revealed which arises partly from the simple form of the model and partly from the Schwarz-Christoffel mapping employed. This indeterminacy is shown to be relatively unimportant in one symmetric case, but leaves open the more general case to further exploration. Application of the method to wedges having short and long afterbodies shows that, in the former case, the agreement between theory and experiment is substantially better than that for the long afterbody. T.M.

N82-11037# College of Aeronautics, Cranfield (England).
A WAKE SOURCE MODEL FOR NON-SYMMETRIC FLOW PAST BLUFF BODIES IN TWO-DIMENSIONAL FLOW
P. A. T. Christopher and I. Wolton Sep. 1981 37 p refs
(C-of-A-Memo-8109) Avail: NTIS HC A03/MF A01

The Parkinson and Jandali model was extended to the case where the bluff body and its wake are not symmetric with respect to the incident flow. In the case of flat plates good agreement with experiment is obtained. With a cylinder of square section agreement is good at low incidence, but at higher incidences the position of the stagnation point is less accurately predicted and there is an associated distortion of the pressure distribution. T.M.

N82-11038# College of Aeronautics, Cranfield (England).
GENERATION OF AXI-SYMMETRIC BODY SHAPES IN SUBSONIC FLOW BY MEANS OF POLYNOMIAL DISTRIBUTIONS OF SOURCES AND DOUBLETS ALONG THE AXIS OF SYMMETRY
P. A. T. Christopher and C. T. Shaw Oct. 1981 52 p refs
(C-of-A-Memo-8110) Avail: NTIS HC A04/MF A01

A method is presented for determining the potential flow around bodies of revolution, at incidence, in uniform, incompressible, flow. This method utilizes polynomial distributions of both sources and doublets, and give considerable advantage over existing techniques. In particular, in a typical case, the computer storage requirement is reduced by a factor of eleven. Compared with panel methods the saving is very much greater. Both body surface and flow field conditions are obtainable and it would appear that the new method is ideally suited to the store trajectory application in place of the existing discrete source method. T.M.

N82-11039*# North Carolina State Univ., Raleigh. Center for Sound and Vibration.
AIRCRAFT WING TRAILING-EDGE NOISE
Ronald L. Underwood and Thomas H. Hodgson 1981 145 p refs
(Grant NsG-1377)
(NASA-CR-164952) Avail: NTIS HC A07/MF A01 CSCL 01A

The mechanism and sound pressure level of the trailing-edge noise for two-dimensional turbulent boundary layer flow was examined. Experiment is compared with current theory. A NACA 0012 airfoil of 0.61 m chord and 0.46 m span was immersed

in the laminar flow of a low turbulence open jet. A 2.54 cm width roughness strip was placed at 15 percent chord from the leading edge on both sides of the airfoil as a boundary layer trip so that two separate but statistically equivalent turbulent boundary layers were formed. Tests were performed with several trailing-edge geometries with the upstream velocity U sub infinity ranging from a value of 30.9 m/s up to 73.4 m/s. Properties of the boundary layer for the airfoil and pressure fluctuations in the vicinity of the trailing-edge were examined. A scattered pressure field due to the presence of the trailing-edge was observed and is suggested as a possible sound producing mechanism for the trailing-edge noise. T.M.

N82-11040*# Northrop Services, Inc., Huntsville, Ala.
SPACE SHUTTLE SOLID ROCKET BOOSTER STING INTERFERENCE WIND TUNNEL TEST ANALYSIS Final Report
B. Conine and W. Boyle 15 Sep. 1981 235 p refs
(Contract NAS8-33816)
(NASA-CR-161885; TR-230-2042) Avail: NTIS HC A11/MF A01 CSCL 01A

Wind tunnel test results from shuttle solid rocket booster (SRB) sting interference tests were evaluated, yielding the general influence of the sting on the normal force and pitching moment coefficients and the side force and yawing moment coefficients. The procedures developed to determine the sting interference, the development of the corrected aerodynamic data, and the development of a new SRB aerodynamic mathematical model are documented. R.J.F.

N82-11041*# Flow Research, Inc., Kent, Wash.
CALCULATIONS OF TRANSONIC POTENTIAL FLOW OVER CASCADES Final Report
Wen-Huei Jou Oct. 1981 36 p refs
(Contract NAS3-22129)
(NASA-CR-165471; FRR-182) Avail: NTIS HC A03/MF A01 CSCL 01A

Transonic flow through a cascade was studied by using the full potential equation and the finite volume method of Jameson and Caughey. The C-type computational grid is generated by an electrostatic analogy and simple shearing transformation. The solution algorithm includes an option of using either an artificial density or an artificial viscosity formulation of the dissipative term. Using the developed code, flows through a cascade of NACA 0012 airfoils and flows through a cascade of shockless blades were computed. It is found that the designed flow through the shockless blade is accurately predicted, the artificial density formulation shows more tolerance to the mesh irregularity, and the C-type mesh does not extend very far upstream for a small pitch-cord ratio. T.M.

N82-11042*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOW SPEED TESTING OF THE INLETS DESIGNED FOR A TAMDEN-FAN V/STOL NACELLE
Robert C. Williams and Andres H. Ybarra (Vough Corp., Dallas) 1981 13 p refs Presented at the V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981
(NASA-TM-82728; E-1031; AIAA-81-2627) Avail: NTIS HC A02/MF A01 CSCL 01A

An approximately 0.25 scale model of a tandem fan nacelle, designed for a subsonic V/STOL aircraft, was tested in a Lewis wind tunnel. Model variables included long and short aft inlet cowls and the addition of exterior strakes to the short inlet cowl. Inlet pressure recoveries and distortion were measured at pitch angles to 40 deg and at combinations of pitch and yaw to 30 deg. Airspeeds covered a range to 135 knots (69 m/sec). The short aft inlet with added strakes had the best aerodynamic performance and is considered suitable for the intended V/STOL application. T.M.

N82-11043*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SUMMARY OF V/STOL INLET ANALYSIS METHODS
Danny P. Hwang 1981 12 p refs Presented at the V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981
(NASA-TM-82725; E-1027) Avail: NTIS HC A02/MF A01 CSCL 01A

Recent extensions and applications of the methods are emphasized. They include the specification of the Kutta condition for a slotted inlet, the calculation of suction and tangential blowing for boundary layer control, and the analysis of auxiliary inlet geometries at angles of attack. A comparison is made with experiment for the slotted inlet. An optimum diffuser velocity distribution was developed. T.M.

N82-11044# Sandia Labs., Albuquerque, N. Mex. Advanced Energy Projects Div.
WIND RIPPLE ANALYSIS
R. E. Akins 1981 8 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030129; DOE/DP-00789/T15) Avail: NTIS HC A02/MF A01

Experimental techniques were developed which allow analysis of full scale performance of wind turbines with particular emphasis on the effects caused by turbulence in the incident wind. These techniques are presented, using data from the DOE/Sandia Vertical Axis Wind Turbine program. Three techniques were developed for use in evaluating the fluctuating output of a wind turbine. Techniques were sought which allowed accurate assessment of the wind ripple of the contributions to the fluctuation in turbine output caused by atmospheric turbulence. The advantages and disadvantages of these techniques are addressed. DOE

N82-11045# Washington Univ. Technology Associates, Inc., St. Louis, Mo.
YAWING OF WIND TURBINES WITH BLADE CYCLIC PITCH VARIATION
K. H. Hohenemser, A. H. P. Swift, and D. A. Peters Aug. 1981 15 p
(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-030091; SERI/TR-8085-3-T1) Avail: NTIS HC A02/MF A01

A two-bladed wind rotor with passive cyclic pitch variation, yawed for the purpose of rotor speed and torque control was studied to determine the potential cost effectiveness of wind energy conversion. A simple mechanism adopted from rotorcraft technology for obtaining passive cyclic pitch variation makes rapid yaw rates possible without causing vibratory hub moments and without producing appreciable out-of-plane blade excursions. A 7.6 m diameter vane stabilized fully instrumented wind rotor having low blade solidity was operated 1980, during 41 days for 96 hours. The operational envelope extended to 16m/sec wind velocity, to 45 degree yaw angle power on and 80 degree yaw angle power off. The rotor was automatically yawed when 228 rpm at 10 kW rotor power was exceeded. Reverse yawing was performed manually. Within the tested performance envelope, loads and vibrations were low. The rotor ran smoothly even at high yaw angles and at high yaw rates. DOE

N82-11046*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPUTATION OF HIGH REYNOLDS NUMBER INTERNAL/EXTERNAL FLOWS
Michael C. Cline and Richard G. Wilmoth 1981 12 p refs Presented at the 5th AIAA Computational Fluid Dyn. Conf., Palo Alto, Calif., 22-23 Jun. 1981
(Contract W-7405-eng-36)
(NASA-TM-84049; DE81-025343; LA-UR-81-1882; CONF-810664-2) Avail: NTIS HC A02/MF A01 CSCL 01A

A general, user oriented computer program, called VNAP2, was developed to calculate high Reynolds number, internal/external flows. The VNAP2 program solves the two dimensional, time dependent Navier-Stokes equations. The turbulence is modeled with either a mixing-length, a one transport equation, or a two transport equation model. Interior grid points are computed using the explicit MacCormack Scheme with special procedures to speed up the calculation in the fine grid. All boundary conditions are calculated using a reference plane characteristic scheme with the viscous terms treated as source terms. Several internal, external, and internal/external flow calculations are presented. DOE

N82-11017# Joint Publications Research Service, Arlington, Va. Foreign Technology Div.
THE WAVE DIAGRAMS FOR DIFFRACTION AND REFLEC-

TION OF A TRAVELING WEAK SHOCK WAVE FROM AN OPEN END OF A SHOCK TUBE
Wei Chung Lei, Wang Ping-Cheng, and Chang Chun Hsiu *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 36-44 Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

N82-11020# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON TRANSONIC FLOW IN HYPERBOLIC LAVAL NOZZLES
Jia Zhen-xue and Lin Tong-ji *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 1-18 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

N82-11021# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPRESSION PROCESSES OF FREE PISTONS AFTER THE OPENING OF NOZZLE IN A HYPERSONIC GUN TUNNEL
Qian Fu-xing, Xiao Lin-kui, and Shi Zhen-ping *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 19-36 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 Presented at the 1st Natl. Shock Wave Conf., 12 Nov. 1978 (For primary document see N82-11019 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

N82-11026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A PRIMARY RESEARCH ON ABLATION EXPERIMENT TECHNIQUE OF THE TURBULENT FLOW OVER A FLAT PLATE SPECIMEN
Han Yin-da, Wang Ke-xiang, and Yu Guang-rong *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 51-64 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Qui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-11028# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RESEARCH ON THE RECIRCULATING FLOW RATE IN THE WAKE OF TWO-DIMENSIONAL FLAME STABILIZERS (UNDER COLD CONDITIONS)
Zhana Qing-fan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81 16 Sep. 1981 p 72-76 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-12023# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE KERNEL FUNCTION COLLOCATION METHOD IN STEADY SUBSONIC FLOW FOR WING WITH CONTROL SURFACES
Chen Jing Song *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

N82-11047# Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.
THREAT ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS) SYMPOSIUM
22 Jul. 1981 177 p refs Symp. held at Washington, D.C., 22 Jul. 1981
(AD-A104563; FAA-RD-81-76) Avail: NTIS HC A09/MF A01 CSCL 01/4

The Federal Aviation Administration held a symposium on Threat Alert and Collision Avoidance System (TCAS) in Washington, D.C., July 22, 1981, which was attended by representatives of 68 organizations and 21 airlines. This report contains the news release announcing the new approach to providing protection against mid-air collisions, 10 presentations and the transcript of the panel discussion. The TCAS will provide a range of capabilities and costs which will meet the requirements of all airspace users. The least complex part of the system is designed for private pilots and would cost about $2,500. The fully capable, or airline, version would cost between $45,000 and $50,000. This new concept represents a new capability which draws on all FAA has learned about collision avoidance in its past efforts, extends and simplifies FAA's efforts to date, provides new capabilities to all users, and is fully compatible with international standards and improvement activities on the Secondary Surveillance Radar (SSR). Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-11048# Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
FLIGHT TRAJECTORY CONTROL INVESTIGATION Final Report, 15 May 1978 - 30 Oct. 1980
M. Bird and J. Karmarker Wright-Patterson AFB, Ohio AFWAL Mar. 1981 174 p refs
(Contract F33615-78-C-3607; AF Proj. 2403)
(AD-A104542; ID-05R-1180; AFWAL-TR-81-3012) Avail: NTIS HC A08/MF A01 CSCL 17/9

Optimal control algorithms for four-dimensional guidance of a transport aircraft were investigated for feasibility. Cost function constraints on the optimal reference path generator appeared impossible to achieve and the optimal guidance algorithms do not achieve significant performance improvement without excessive increases in sophistication and cost of the onboard avionics computer. A modularized existing Mission Management system allows a three-phase flight test plan to demonstrate the operational capability of the existing classical integrated flight trajectory control algorithms. Author (GRA)

N82-11049# General Accounting Office, Washington, D. C. Community and Economics Development Div.
FAA MISSES OPPORTUNITIES TO DISCONTINUE OR REDUCE OPERATING HOURS OF SOME AIRPORT TRAFFIC CONTROL TOWERS Report to the Congress
1 Jun. 1981 39 p
(PB81-224214; CED-81-100) Avail: NTIS HC A03/MF A01 CSCL 17G

FAA is not adequately surveying or evaluating air traffic levels at 24 hour control towers to identify opportunities to reduce operating hours and save money. GRA

N82-11130*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
AN ULTRASONIC TRANSDUCER WITH GAUSSIAN RADIAL VELOCITY DISTRIBUTION
Paul S. Zerwekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 71-73 refs Presented at the IEEE

Ultrasonics Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

N82-11131*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
OPTICAL DETECTION OF PULSED SURFACE PARTICLE DISPLACEMENTS
Paul S. Zewekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 78-80 refs Presented at the IEEE Region 3 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

N82-11133*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electric Engineering.
DUAL DIFFERENTIAL INTERFEROMETER FOR MEASUREMENTS OF BROADBAND SURFACE ACOUSTIC WAVES
Tyson M. Turner and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 87-89 refs Presented at the IEEE Ultrasonic Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-11050*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PARAMETRIC STUDY OF MICROWAVE-POWERED HIGH-ALTITUDE AIRPLANE PLATFORMS DESIGNED FOR LINEAR FLIGHT
Charles E. K. Morris, Jr. Nov. 1981 74 p refs
(NASA-TP-1918; L-14606) Avail: NTIS HC A04/MF A01 CSCL 01C

The performance of a class of remotely piloted, microwave powered, high altitude airplane platforms is studied. The first part of each cycle of the flight profile consists of climb while the vehicle is tracked and powered by a microwave beam; this is followed by gliding flight back to a minimum altitude above a microwave station and initiation of another cycle. Parametric variations were used to define the effects of changes in the characteristics of the airplane aerodynamics, the energy transmission systems, the propulsion system, and winds. Results show that wind effects limit the reduction of wing loading and the increase of lift coefficient, two effective ways to obtain longer range and endurance for each flight cycle. Calculated climb performance showed strong sensitivity to some power and propulsion parameters. A simplified method of computing gliding endurance was developed. S.L.

N82-11051*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE EFFECTS OF LATERAL AERODYNAMIC UNCERTAINTIES ON THE HANDLING QUALITIES OF THE SPACE SHUTTLE ORBITER AT MACH NUMBERS OF 1.5 AND .6
Lawrence W. Brown Sep. 1981 42 p ref
(NASA-TM-83193) Avail: NTIS HC A03/MF A01 CSCL 01C

The effects of aerodynamic uncertainties on the handling qualities of the space shuttle orbiter were investigated with the use of six-degree-of-freedom, nonlinear equations of motion on the hybrid computer system. Flight condition characteristics for Mach numbers of 1.5 and .6 for the nominal and off nominal angle of attack conditions were selected for this investigation. Results revealed that at the low Mach number condition (.6), only a few problems existed for the angle of attack range considered and the many combinations of large aerodynamic variations considered. Moreover, none of these problems were considered to be related to poor handling qualities. For the angle of attack conditions considered at the high Mach number (1.5) problems existed with reduction of roll rate which can result in roll reversal conditions. In many cases, sideslip became proverse and increased rudder deflections and yaw jets were required. Author

N82-11052*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TESTS OF A COMPOSITE POROUS LEADING EDGE FOR USE WITH A LIQUID ANTI-ICE SYSTEM
David L. Kohlman Sep. 1981 21 p refs
(Grant NAG3-71)
(NASA-CR-164966; KU-FRL-464-3) Avail: NTIS HC A02/MF A01 CSCL 01C

The efficacy of liquid ice protection systems which distribute a glycol-water solution onto leading edge surfaces through a porous skin was demonstrated in tests conducted in the NASA Lewis icing research tunnel using a composite porous leading edge panels. The data obtained were compared with the performance of previously tested stainless steel leading edge with the same geometry. Results show: (1) anti-ice protection of a composite leading edge is possible for all the simulated conditions tested; (2) the glycol flow rates required to achieve anti-ice protection were generally much higher than those required for a stainless steel panel; (3) the low reservoir pressures of the glycol during test runs indicates that more uniform distribution of glycol, and therefore lower glycol flow rates, can probably be achieved by decreasing the porosity of the panel; and (4) significant weight savings can be achieved in fluid ice protection systems with composite porous leading edges. The resistance of composite panels to abrasion and erosion must yet be determined before they can be incorporated in production systems. A.R.H.

N82-11053*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SELECTED BIBLIOGRAPHY OF NACA-NASA AIRCRAFT ICING PUBLICATIONS
John J. Reinmann, comp. Aug. 1981 127 p
(NASA-TM-81651; E-668) Avail: NTIS HC E15/MF A01 CSCL 01C

A summary of NACA-NASA icing research from 1940 to 1962 is presented. It includes: the main results of the NACA icing program from 1940 to 1950; a selected bibliography of 132 NACA-NASA aircraft icing publications; a technical summary of each document cited in the selected bibliography; and a microfiche copy of each document cited in the selected bibliography. T.M.

N82-11054*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPARISON OF THEORETICAL AND EXPERIMENTAL PRESSURE DISTRIBUTIONS FOR TWO ADVANCED FIGHTER WINGS
H. P. Haney (Vought Corp., Dallas) and R. M. Hicks Oct. 1981 87 p refs
(NASA-TM-81331; A-8741) Avail: NTIS HC A05/MF A01 CSCL 01C

A comparison was made between experimental pressure distributions measured during testing of the Vought A-7 fighter and the theoretical predictions of four transonic potential flow codes. Isolated wind and three wing-body codes were used for comparison. All comparisons are for transonic Mach numbers and include both attached and separate flows. In general, the wing-body codes gave better agreement with the experiment than did the isolated wing code but, because of the greater complexity of the geometry, were found to be considerably more expensive and less reliable. Author

N82-11055# Computational Mechanics Consultants, Knoxville, Tenn.
A NUMERICAL THREE-DIMENSIONAL TURBULENT SIMULATION OF A SUBSONIC VSTOL JET IN A CROSS-FLOW USING A FINITE ELEMENT ALGORITHM Final

Report, Sep. 1979 - Sep. 1980
A. J. Baker, J. A. Orzechowski, and P. D. Manhardt Jun. 1981 72 p refs
(Contract N62269-79-C-0295)
(AD-A104514; NADC-79021-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

The purpose of this study, the results of which are reported herein, was to formulate a mathematical model of the basic VSTOL jet, and to validate its appropriateness by performing a series of computational experiments on the discrete analog (numerical) approximation to the mathematical description. Since the VSTOL jet problem is essentially steady, turbulent and fully three-dimensional, the mathematical description must be quite comprehensive. The approach selected was to utilize a continuity-constrained, finite element algorithm for solution of the parabolized form of the time-averaged, three-dimensional Navier-Stokes equations (3DPNS). The essential ingredients of this algorithmic description are presented and discussed. A production finite element computer code (COMOC:3DPNS) was utilized to conduct the computational experiments, and the description of problem definition and data deck preparation is contained at the end of the report. The key results of the computational experiments are discussed, regarding the basic causal mechanisms of the VSTOL jet, as well as results for confirmation test cases documenting viability of the constructed computational model. Author (GRA)

N82-11056# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ROTORCRAFT ICING: STATUS AND PROSPECTS
Aug. 1981 136 p refs
(AGARD-AR-166; ISBN-92-835-1397-5) Avail: NTIS HC A07/MF A01

The impact of icing meteorological conditions on helicopter operations was examined, and methods for improving ice protection investigated. For individual titles, see N82-11057 through N82-11061.

N82-11057# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
OPERATIONAL ENVIRONMENT, METEOROLOGICAL CONDITIONS AND WEATHER FORECASTING
In its Rotorcraft Icing Aug. 1981 p 1-13 refs (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

Helicopter icing is a significant operational consideration for helicopters operating throughout Europe. Existing weather statistics demonstrate significant operational limitations during the winter months, and for as much as five percent of the time on a year-around basis. Unfortunately the existing meteorological data base is insufficient to describe the operating environment in which NATO rotorcraft must conduct flight. At present for design purposes, the United States Federal Air Regulation 25 Appendix C or the UK Icing Atmosphere are employed for determination of airworthiness release of helicopters. However, neither of these atmospheres adequately defines the operational environment. This condition is exacerbated by the fact that forecasting techniques are currently inadequate to allow unrestricted helicopter operations in icing conditions. Increased coordination among cloud physicists, forecasters, and helicopter icing specialists is needed - and ultimately a new icing atmosphere is required to better define the helicopter operational icing requirements. J.D.H.

N82-11058# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
TECHNOLOGY BASE FOR ICING INSTRUMENTATION AND MATHEMATICAL MODELLING
In its Rotorcraft Icing Aug. 1981 p 14-33 refs (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

The fundamental mechanisms of ice accretion and shedding from rotor airfoils are considered. It is felt that an opportunity exists to exploit a combination of two-dimensional model and three-dimensional model scale testing, measurement of ice release mechanisms, inclusion of heat transfer models, and consideration of icing simulation. These efforts should be aimed at development of analytical models verified by both laboratory and full-scale data which then can be used to better predict performance of rotors in icing conditions. Only with the above analytical basis can ice accretion and shedding characteristics become sufficiently predictable to permit the determination of what type of ice protection is necessary or, conversely, what degree of flight envelope release might be permitted with a given level of ice protection. Further improvement in research and development of operational icing sensors is recommended. J.D.H.

N82-11059# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
FACILITIES FOR DEVELOPMENT AND CLEARANCE
In its Rotorcraft Icing Aug. 1981 p 34-53 (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

A catalog of all NATO icing test facilities was compiled. It is recommended that the Canadian National Research Council's small high speed icing tunnel is a one-of-a-kind facility that needs to be available to support analytical development recommended, and that the tunnel should be reactivated or replaced. A decision has been made to retain the Ottawa Spray Rig in operational status for the near future. Efforts underway at the NASA-Lewis Research Center regarding rehabilitation of the Icing Research Tunnel and considering a major new icing test facility are endorsed. The US Army Helicopter Icing Spray System Improvement Program is also supported by the Working Group and, as a recommendation for future discussion, the need for European airborne icing spray systems should be considered. A conclusion reached by the Working Group is that current full scale development and qualification facilities and procedures are extremely expensive and time consuming. J.D.H.

N82-11060# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ICE PROTECTION SYSTEM TECHNOLOGY
In its Rotorcraft Icing Aug. 1981 p 54-99 refs (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

Deicing systems technology concepts are discussed. The conclusion is that electrothermal deicing systems are the only effective present system for broad application. However, it is noted that the cost of electrothermal deicing in terms of weight, power and expense is high, and provides an incentive for examination of alternatives. Therefore, additional work is clearly warranted on options such as ice phobics, fluid ice suppressant systems, pneumatic boots, vibratory surface systems, microwave and other hybrid systems concepts. It is recommended that the operational limitations of ice protected aircraft such as the Black Hawk and Puma, be explored with the ice protection systems deliberately turned off, so as to simulate an aircraft without (or with inoperative) ice protection. Only through such definition of the actual icing environment can a better estimation be made of the operational impact of icing conditions on helicopter flight operations. J.D.H.

N82-11061# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
PROPOSED STANDARD REQUIREMENTS AND PROCEDURES FOR ICING CLEARANCE
In its Rotorcraft Icing Aug. 1981 p 100-117 (For primary document see N82-11056 02-05)
Avail: NTIS HC A07/MF A01

A set of proposed standard requirements and procedures for icing clearance is presented. It is felt that this clearance procedure constitutes a basis for NATO-wide icing clearance and should be adopted by the NATO military community as an interim approach. The opportunity also exists to consider this proposal for civil icing clearance. J.D.H.

N82-11016# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PRINCIPLES AND METHODS FOR SHAPING THE WING ROOT REGIONS OF A WING-BODY COMBINATION AT TRANSONIC AND LOWER SUPERSONIC SPEEDS
Yang Tso Sheng, Tai Chia Tsun, Chen Ching Sung, and Fan I. Chia *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 20-35 refs Transl. into ENGLISH from Acta Mech.

Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-11062# Hughes Aircraft Co., El Segundo, Calif. Display Systems Lab.
STUDY AND DEVELOPMENT OF AN INTEGRATED HEAD-UP DISPLAY Final Report, 1 Jul. 1976 - 31 Aug. 1980
Michael N. Ernstoff Jun. 1981 112 p refs
(Contract F33615-76-C-1243; AF Proj. 2003)
(AD-A104337; HAC-D6210; AFWAL-TR-81-1042) Avail: NTIS HC A06/MF A01 CSCL 14/5

The purpose of the Integrated Head-Up Display (I-HUD) program was to demonstrate the advantages associated with using a Liquid Crystal Matrix Display and Diffraction Optics combiner in the design and construction of a high brightness head-up display system. The program resulted in the design and fabrication of the I-HUD brassboard consisting of a pilot's display unit, built in a form factor similar to that of the production F16 HUD, and test support equipment. The following devices and modules were developed: A 350-by-350 pixel Liquid Crystal Matrix Display complete with custom LSI circuit drivers, a diffraction optics combiner, a diffraction optics diffusing screen, a specular mode projector, and custom lamp with a narrow band (green) spectral output. Although the completed I-HUD brassboard did not meet all of its design goals, it does demonstrate the feasibility of applying advanced technology to the designs of Head-Up Displays. The I-HUD program has succeeded in solving many of the fundamental design problems associated with this approach and stands as a milestone in the development of solid state display devices and the development of more highly reliable, cost effective Head-Up Displays. GRA

N82-11063# Panametrics, Inc., Waltham, Mass.
ADVANCED FUEL FLOWMETER FOR FUTURE NAVAL AIRCRAFT Final Report, Dec. 1977 - Apr. 1981
L. C. Lynnworth, N. E. Pedersen, J. E. Bradshaw, J. E. Matson, E. S. Johansson, and T. H. Nguyen 28 Jun. 1981 149 p refs
(Contract N62269-78-C-0069)
(AD-A104364; NADC-80254-60) Avail: NTIS HC A07/MF A01 CSCL 21/4

A fuel mass flowmeter was developed with the objective of accurately measuring the mass flow rate M-dot of various fuels and their mixtures, for flow rates from 91 to 11,364 kg/hr (200 to 25,000 lb/hr). The delivered system included: (1) an area averaging zigzag flow velocimeter cell, in which the fuel was interrogated in opposite directions by an alternating sequence of ultrasonic pulses, to determine the area averaged flow velocity, V-bar; (2) a densitometer based on the Clausius-Mosotti law, in which the fuel density rho is determined; and (3) electronics which computed rho and V-bar separately, and then generated a square wave output having a frequency proportional to the product of rho and V-bar, namely M-dot = rho(V-bar)A, where A = velocimeter cell cross sectional area. The transducers can operate beyond the temperature range -38 to +150 C, and the flow cell, with transducers, at pressures up to 1500 psig and in the 3-axis, 20 g, 5 to 2000 Hz vibration environment specified by MIL Std. 810-514.1, except for noise problems at a few discrete frequencies. GRA

N82-11064# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, DATA TRANSMISSION STUDY Interim Report, Jun. 1979 - Aug. 1980
Aug. 1980 57 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85) (AD-A104243; ACS-12177; USAAVRADCOM-TR-79-0270-1; IR-1) Avail: NTIS HC A04/MF A01 CSCL 17/2

The development of nonmission related status information is one area of rotary wing instrumentation which has not kept pace with the state of art. This includes raw data, discrete and summary status information related to the engine, transmission, rotor, fuel, hydraulic and electrical subsystems. The objective of this report is to define an efficient and cost effective data transmission method for an electronic master monitor and advisory display system (EMMADS). Several current standard and nonstandard data bus specifications which are applicable to the EMMADS system are introduced. Their tradeoff in terms of hardware, software and system considerations are compared. It should be noted that a typical standard bus specs addresses only the protocol and message formats, not the mechanization of the control algorithm. Hence there is a considerable variation in implementation and cost even for the same bus standard. The materials represent a snapshot of the current state of the art technology. The use of optical fiber instead of conventional electrical cable (such as coaxial) as the transmission medium is also investigated based on the current technical reports. The problems of electromagnetic interference (EMI), and rejection techniques are mentioned. GRA

N82-11065# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, HUMAN ENGINEERING SUMMARY REPORT Interim Report, Jun. 1979 - Jun. 1981
Jun. 1981 227 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85) (AD-A104244; ACS-12385; USAAVRADCOM-TR-79-0270-3; IR-3) Avail: NTIS HC A11/MF A01 CSCL 17/2

Information requirements, information handling formats, and the necessary display/control design criteria are discussed for a system being developed to integrate and display nonmission related information on the status of various subsystems on rotary wing aircraft. GRA

N82-11066# Los Alamos Scientific Lab., N. Mex. Electronics Div.
OUTSIDER'S LOOK AT FLIGHT INSTRUMENTATION
Arvid S. Lundy 1981 7 p refs Presented at the AIAA/SAE/ASME Joint Propulsion Conf., Colorado Springs, Colo., 27-29 Jul. 1981
(Contract W-7405-eng-36)
(DE81-025409; LA-UR-81-1748; CONF-810724-1) Avail: NTIS HC A02/MF A01

Ideas and speculations on possible diagnostic instrumentation for use in missile flight testing are presented. Techniques for use in the development of flight instrumentation are recommended. DOE

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-11067# National Aerospace Lab., Tokyo (Japan).
NEW MOLDING METHOD OF THREE-DIMENSIONAL HOLLOW PHOTOELASTIC MODEL AND CENTRIFUGAL STRESS ANALYSIS OF AIR COOLED TURBINE BLADE MODEL
Toyoaki Yoshida, Katsutashi Matsusue, Kitao Takahara, and Ryosaku Hashimoto May 1981 17 p refs In ENGLISH; JAPANESE Summary
(NAL-TR-427T; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

A new molding method for a three dimensional hollow photoelastic model was invented and centrifugal stress analysis

performed for air cooled turbine blade models to which the new method was applied. A distinctive feature of the molding method is the introduction of a copper coated wax core which forms a three dimensional hollow shape inside a model. The air cooled turbine photoelastic model with a coolant passage simulates the first stage rotor blade in the high temperature turbine full scale model HT-10H used at the NAL. The results of stress analysis cleared the critical regions and stress magnitude and thus they are of great aid to the successful development of a full scale turbine model. Author

N82-11068*# Teledyne Continental Motors, Muskegon, Mich. General Products Div.
LIGHTWEIGHT DIESEL ENGINE DESIGNS FOR COMMUTER TYPE AIRCRAFT
Alex P. Brouwers Jul. 1981 70 p refs
(Contract NAS3-22149)
(NASA-CR-165470; Rept-995) Avail: NTIS HC A04/MF A01 CSCL 21E

Conceptual designs and performance of advanced technology lightweight diesel engines, suitable for commuter type aircraft power plants are defined. Two engines are discussed, a 1491 kW (2000 SHP) eight-cylinder engine and a 895 kW (1200 SHP) six-cylinder engine. High performance and related advanced technologies are proposed such as insulated cylinders, very high injection pressures and high compressor and turbine efficiencies. The description of each engine includes concept drawings, a performance analysis, and weight data. Fuel flow data are given for full and partial power up to 7620m altitude. The performance data are also extrapolated over a power range from 671 kW(900 SHP) to 1864 kW (2500 SHP). The specific fuel consumption of the 1491 kW (2000 SHP) engine is 182 g/hWh (.299 lb/HPh) at cruise altitude, its weight 620 kg (1365 lb.) and specific weight .415 kg/kW (.683 lb/HP). The specific fuel consumption of the 895 kW (1200 SHP) engine is 187 g/hWh (.308 lb/HPh) at cruise altitude, its weight 465 kg (1025 lb.) and specific weight .520 kg/kW (.854 lb/HP). R.J.F.

N82-11069# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
SUBSONIC CASCADE WIND TUNNEL TESTS USING A COMPRESSOR CONFIGURATION OF DCA BLADES M.S. Thesis
Frank S. Cina Jun. 1981 210 p refs
(AD-A104597) Avail: NTIS HC A10/MF A01 CSCL 21/5

Tests are reported in which air incidence angle was varied to a cascade of 20 blades, 5 inches in chord with aspect ratio of 2.0 and solidity of 1.67. Preliminary blade element performance data were obtained using pneumatic probe surveys and surface pressures were also measured. Results of preparatory tests of a similar cascade of 15 C-series blades at a solidity of 1.28 are also included. Whereas the flow in the C-series blading cascade was always acceptable, the flow in the DCA blading cascade was not acceptable at negative incidence angles. A modification of the cascade inlet guide vanes is recommended which will guarantee periodic conditions and serve to generate more nearly uniform inlet flow at all test conditions. Author (GRA)

N82-11015# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ARBITRARY QUASI-ORTHOGONAL SURFACE METHOD FOR COMPUTING THREE-DIMENSIONAL FLOW IN TURBINE MACHINERY. 2. CALCULATION OF THE THREE-DIMENSIONAL FLOW WITH THE S SUB 1-SURFACE TWISTED
Xin Xiao-Kang, Jiang Jin-Liang, and Zhu Shi-Can *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 1-19 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 (For primary document see N82-11014 02-01)
Avail: NTIS HC A03/MF A01 CSCL 01/2

N82-11024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THEORETICAL INVESTIGATIONS AND EXPERIMENTAL RESEARCHES FOR HIGHER SUBSONIC TWO-DIMENSIONAL COMPRESSOR CASCADE
Yan Ru-qun and Qian Zhao-yan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Thermophys. Eng. Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-11025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A THEORETICAL ANALYSIS OF THE STREAM SURFACE OF REVOLUTION WITH SUPERSONIC INLET FLOW IN A TRANSONIC AXIAL COMPRESSOR
Xu Jian-zhong, Jiang Zuo-ren, Yang Jin-sheng, Zhang Ying, and Du Zhuan-she *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. and Technol. Conf., Gui Lin, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

N82-11027# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A NEW METHOD OF COOLING TURBINE VANES
Gu Wei-zao, Zhang Yu-ming, and Xu Hong-kun *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 65-71 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhou, China, Apr. 1980 (For primary document see N82-11023 02-01)
Avail: NTIS HC A05/MF A01 CSCL 21/5

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-11070*# Analytical Mechanics Associates, Inc., Hampton, Va.
AN INFLUENCE COEFFICIENT METHOD FOR THE APPLICATION OF THE MODAL TECHNIQUE TO WING FLUTTER SUPPRESSION OF THE DAST ARW-1 WING Final Report
Samuel Pines Nov. 1981 49 p refs
(Contract NAS1-15593)
(NASA-CR-165772; AMA-81-25) Avail: NTIS HC A03/MF A01 CSCL 01C

The methods used to compute the mass, structural stiffness, and aerodynamic forces in the form of influence coefficient matrices as applied to a flutter analysis of the Drones for Aerodynamic and Structural Testing (DAST) Aeroelastic Research Wing. The DAST wing was chosen because wind tunnel flutter test data and zero speed vibration data of the modes and frequencies exist and are available for comparison. A derivation of the equations of motion that can be used to apply the modal method for flutter suppression is included. A comparison of the open loop flutter predictions with both wind tunnel data and other analytical methods is presented. S.L.

N82-11071*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
AEROACOUSTIC THEORY FOR NONCOMPACT WING-GUST INTERACTION
Rudolph Martinez and Sheila E. Widnall Oct. 1981 124 p refs
(Grant NsG-2142)
(FDRL-81-7) Avail: NTIS HC A06/MF A01 CSCL 01C

Three aeroacoustic models for noncompact wing-gust interaction were developed for subsonic flow. The first is that for a two dimensional (infinite span) wing passing through an oblique gust. The unsteady pressure field was obtained by the Wiener-Hopf technique; the airfoil loading and the associated acoustic field were calculated, respectively, by allowing the field point down on the airfoil surface, or by letting it go to infinity. The second model is a simple spanwise superposition of two

dimensional solutions to account for three dimensional acoustic effects of wing rotation (for a helicopter blade, or some other rotating planform) and of finiteness of wing span. A three dimensional theory for a single gust was applied to calculate the acoustic signature in closed form due to blade vortex interaction in helicopters. The third model is that of a quarter infinite plate with side edge through a gust at high subsonic speed. An approximate solution for the three dimensional loading and the associated three dimensional acoustic field in closed form was obtained. The results reflected the acoustic effect of satisfying the correct loading condition at the side edge. R.J.F.

N82-11072# Boeing Military Airplane Development, Seattle, Wash. Advanced Airplane Branch.

AIRCRAFT DIGITAL INPUT CONTROLLED HYDRAULIC ACTUATION AND CONTROL SYSTEM Final Report, Aug. 1977 - Dec. 1980

Eugene T. Raymond and Curtiss W. Robinson Mar. 1981 214 p refs

(Contract F33615-77-C-2034; AF Proj. 3145)

(AD-A104263; AFWAL-TR-81-2012) Avail: NTIS HC A10/MF A01 CSCL 09/2

The development of an Incremental digitally-controlled electrohydraulic incremental digitally-controlled electrohydraulic actuation system (DEHA) is reported. An electronic digital controller and a prototype DEHA unit, with an electric-stepper-motor-driven rotary distributor valve, two hydraulic drive motors, and a torque-summing gearbox, were assembled. Significant reductions in the hydraulic power normally required with a conventional geared hydraulic motor system, and some degree of hydraulic power recovery were obtained. Author (GRA)

N82-11073# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Guidance and Control Panel.

THEORY AND APPLICATIONS OF OPTIMAL CONTROL IN AEROSPACE SYSTEMS

Pieter Kant, ed. (National Aerospace Lab., Emmeloord, Netherlands) London Jul. 1981 283 p refs

(AGARD-AG-251; ISBN-92-835-1391-6) Copyright. Avail: NTIS HC A13/MF A01

The basic concepts of control theory were reviewed. Pratical design techniques that were developed from the theory are presented. Design examples and practical applications in real systems are described. Major emphasis is on flight control of distributed parameter systems. For individual titles, see N82-11074 through N82-11087.

N82-11074# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

AN OVERVIEW OF OPTIMAL CONTROL IN AEROSPACE SYSTEMS

Arthur E. Bryson, Jr. *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 5 p refs (For primary document see N82-11073 02-08)

Avail: NTIS HC A13/MF A01

Optimal control started with the calculus of variations (COV). The digital computer made the calculus of variations a practical tool for synthesis of optimal control logic. Optimal control concepts and algorithms are used not only in the field of automatic control but also in fields of structural optmization, econometrics, and operations research. T.M.

N82-11075# Universite Catholique de Louvain (Belgium)

THEORY OF STOCHASTIC OPTIMAL CONTROL SOME BASIC NOTIONS

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 19 p refs (For primary document see N82-11073 02-08)

Avail: NTIS HC A13/MF A01

The optimal control problem for stochastic systems is described in details. Several classes of policy are defined and compared. The corresponding solutions are deduced from Bellman's principle and discussed in connection with the concept of dual effect of the control. After the derivation of the optimal closed-loop solution for the linear quadratic Gaussian problem, several algorithms are proposed for the nonlinear problem and discussed in the perspective of their implementation in aerospace applications. T.M.

N82-11076# Princeton Univ., N. J. Flight Research Lab.

AN INTRODUCTION TO STOCHASIC OPTIMAL CONTROL THEORY

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 33 p refs (For primary document see N82-11073 02-08)

Avail: NTIS HC A13/MF A01

The design of control logic that commands a dynamic system to a desired output or that augments the system's stability is facilitated if objectives are expressed in a quantitative criterion, because the optimization of this criterion establishes a feasible design point for control. If the information which the control logic must use is uncertain or if the dynamic system is forced by random disturbances, only the expected value can be optimized. The methodology for design is based upon stochastic optimal control theory. After introducing the dynamic models of interest, optimal control and estimation are presented separately. Limitations of this approach are addressed, and the unified design of linear stochastic optimal controllers for analog and digital implementations is described. The principal benefit of stochastic optimal control theory is that it provides an engineering framework within which practical control design can be accomplished for complex dynamic systems. T.M.

N82-11077# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.

DESIGN CONSIDERATIONS FOR OPTIMAL FLIGHT CONTROL SYSTEMS

F. R. Gill *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 21 p refs (For primary document see N82-11073 02-08)

Avail: NTIS HC A13/MF A01

Following a review of the several interacting factors affecting the design of control laws for any kind of flight control system (FCS), the modelling problem is discussed, including accuracy requirements for computer models of the aircraft FCS, external disturbances and sensor noise. The state-of-the-art in designing the control and scheduling laws is surveyed and the limits of conventional control techniques are exposed. To overcome these limits, the use of selected nonlinear control techniques is discussed, including the concept of redundant adaptation with safeguards. T.M.

N82-11078*# Honeywell Systems and Research Center, Minneapolis, Minn. Systems and Control Technology Sect.

DESIGN TECHNIQUES FOR MUTLIVARIABLE FLIGHT CONTROL SYSTEMS

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 33 p refs (For primary document see N82-11073 02-08)

(Contracts NAS4-2518; N00014-75-C-01444)

Avail: NTIS HC A13/MF A01 CSCL 01C

Techniques which address the multi-input closely coupled nature of advanced flight control applications and digital implementation issues are described and illustrated through flight control examples. The techniques described seek to exploit the advantages of traditional techniques in treating conventional feedback control design specifications and the simplicity of modern approaches for multivariable control system design. T.M.

N82-11079# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany)

PRACTICAL DESIGN AND REALIZATION OF A DIGITAL ADAPTIVE FLIGHT CONTROL SYSTEM

V. Krebs and U. Hartmann *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 22 p refs Sponsored in part by the West German Ministry of Defense (For primary document see N82-11073 02-08)

Avail: NTIS HC A13/MF A01

A new approach for the design and the practical realization of a digital adaptive command and stability system is proposed. The control law for the longitudinal motion of the aircraft is obtained by state vector feedback using the MIL-F-8785 B handling qualities requirements. The design principle is based on decoupling of the angle of attack and pitch rate on the one

hand and the pole allocation method for the eigenvalues of the control system on the other hand. Since the necessary gain factors contain unknown and variable aircraft parameters, an on-line fading-memory least squares algorithm for the estimation of these parameters is used. Only conventional aircraft sensors (rate gyros and accelerometers) and an airborne digital computer are necessary. Hybrid simulations of the complete system as well as flight test results demonstrate the efficiency of the concept. T.M.

N82-11080# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).

CONTROL LAW DESIGN FOR TRANSPORT AIRCRAFT FLIGHT TASKS

Volkmar Adam and Hagen Leyendecker *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 13 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

An integrated digital flight control system was developed. The primary objective of the program was, both to improve the manual control of the aircraft assisted by control systems, and to develop new control and display systems. In addition, automation is to be provided for loner flight phases which are to be optimized with respect to fuel consumption, flight time, or other criteria. Aspects of the control law design and flight test experience with the integrated digital flight control system are described. DOE

N82-11081# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.

CONTROL DESIGN OF FLEXIBLE SPACECRAFT

Robert E. Skelton *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 28 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

When compared to other large scale systems, flexible spacecraft have some peculiarities which can make control more difficult. Emphasis is placed upon the time domain and suboptimal linear quadratic guassian (LOG) methods, with special attention given to the effects of modeling errors. These effects are discussed in light of the model reduction problem, stability, and control design. Stability, controllability and observability computations are reduced to their simplest form possible to provide insight and to facilitate the location of sensors and actuators. The techniques of modal cost analysis are used to identify the critical parameters and the critical models of the structure. In the final stage of design, component cost analysis reveals which states of the optimal dynamical controller should be deleted to produce a reduced controller which is compatible with the on-line computer software limitations. T.M.

N82-11082*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

OPTIMUM CLIMB AND DESCENT TRAJECTORIES FOR AIRLINE MISSIONS

Heinz Erzberger *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 15 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01 CSCL 01C

The characteristics of optimum fixed-range trajectories whose structure is constrained to climb, steady cruise, and descent segments are derived by application of optimal control theory. The performance function consists of the sum of fuel and time costs, referred to as direct operating cost (DOC). The state variable is range to go and the independent variable is energy. In this formulation a cruise segment always occurs at the optimum cruise energy for sufficiently large range. At short ranges (400 n. mi. and less), a cruise segment may also occur below the optimum cruise energy. The existence of such a cruise segment depends primarily on the fuel flow vs thrust characteristics and on thrust constraints. If thrust is a free control variable along with airspeed, it is shown that such cruise segments will not generally occur. If thrust is constrained to some maximum value in climb and to some minimum in descent, such cruise segments generally will occur. T.M.

N82-11083*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

APPLICATION OF NONLINEAR SYSTEMS INVERSES TO AUTOMATIC FLIGHT CONTROL DESIGN: SYSTEM CONCEPTS AND FLIGHT EVALUATIONS

George Meyer and Luigi Cicolani *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 29 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01 CSCL 01C

A practical method for the design of automatic flight control systems for aircraft with complex characteristics and operational requirements, such as the powered lift STOL and V/STOL configurations, is presented. The method is effective for a large class of dynamic systems requiring multi-axis control which have highly coupled nonlinearities, redundant controls, and complex multidimensional operational envelopes. It exploits the concept of inverse dynamic systems, and an algorithm for the construction of inverse is given. A hierarchic structure for the total control logic with inverses is presented. The method is illustrated with an application to the Augmentor Wing Jet STOL Research Aircraft equipped with a digital flight control system. Results of flight evaluation of the control concept on this aircraft are presented. T.M.

N82-11084*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MANAGEMENT OF REDUNDANCY IN FLIGHT CONTROL SYSTEMS USING OPTIMAL DECISION THEORY

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 12 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01 CSCL 01C

The problem of using redundancy that exists between dissimilar systems in aircraft flight control is addressed. That is, using the redundancy that exists between a rate gyro and an accelerometer--devices that have dissimilar outputs which are related only through the dynamics of the aircraft motion. Management of this type of redundancy requires advanced logic so that the system can monitor failure status and can reconfigure itself in the event of one or more failures. An optimal decision theory was tutorially developed for the management of sensor redundancy and the theory is applied to two aircraft examples. The first example is the space shuttle and the second is a highly maneuvering high performance aircraft--the F8-C. The examples illustrate the redundancy management design process and the performance of the algorithms presented in failure detection and control law reconfiguration. T.M.

N82-11085# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

OPTIMAL CONTROL IN THE LUNAR MODULE DIGITAL AUTOPILOT

In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 17 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

The Apollo lunar module (LM) digital autopilot was a first generation computer-based automatic control system. The use of a digital computer permitted the implementation of a controller structure and control algorithms that would have been difficult to synthesize using analog controller technology. Optimal control theory recommended a cascade synthesis for controller design: an observer or estimator of the state followed by memoryless control laws. This structure was utilized in the LM autopilot. The state estimator had some similarities to a Kalman filter, but the variable gains were chosen to minimize nonlinear measurement quantization effects. The memoryless reaction control system (RCS) laws employed parabolic switching curves as suggested by minimum time/fuel control theory for a double integral plant. T.M.

N82-11086# Analytic Sciences Corp., Reading, Mass.

APPLICATION OF OPTIMAL CONTROL TECHNIQUES TO TACTICAL MISSILE GUIDANCE

Charles F. Price *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 13 p refs (For primary document see N82-11073 02-08)
(Contracts N00014-69-C-0391; F08635-77-C-0034)
Avail: NTIS HC A13/MF A01

A survey of applications reported in the literature is presented.

Case studies were developed using several different linear-quadratic-Gaussian formulations of stochastic optimal control problems. A new guidance law is presented which explicitly accounts for target parameter uncertainty. Simulation results and parameter sensitivity studies are presented which provide performance comparisons between the optimal guidance techniques and conventional proportional guidance. T.M.

N82-11087# Systems Control, Inc., Palo Alto, Calif.
DEVELOPMENT OF MULTIVARIABLE CONTROLLERS FOR AIRCRAFT TURBINE ENGINES
Ronald L. DeHoff, Stephen M. Rock, and Muhammed M. Akhter *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 12 p refs (For primary document see N82-11073 02-08)
Avail: NTIS HC A13/MF A01

A model reference structure is discussed which is shown to be a flexible framework within which digital control programs of a wide variety of function and complexity can be formulated. The development of the plant reference model is discussed and trade-offs between accuracy and complexity presented. The techniques used to produce optimized, feed-forward state, control and output trajectories are presented. The well-known methods of regulator synthesis using quadratic performance functions are briefly reviewed and the results of several successful applications of this methodology are summarized. T.M.

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-11088* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND TUNNEL SUPPLEMENTARY MACH NUMBER MINIMUM SECTION INSERT Patent
Lana M. Couch, inventor (to NASA) Issued 1 Sep. 1981 6 p Filed 28 Mar. 1980 Supersedes N80-22369 (18 - 13, p 1674
(NASA-Case-LAR-12532-1; US-Patent-4,286,460; US-Patent-Appl-SN-135040; US-Patent-Class-73-147) Avail: US Patent and Trademark Office CSCL 14B

A device is described which changes the Mach number capability of a wind tunnel without permanently altering the existing nozzle of the tunnel. An insert is removably attached to the wall of the existing nozzle expansion area thereby creating a second minimum section upstream of the model test section. The added insert may be removed without complicated and expensive changes to the basic wind tunnel. In one embodiment, a removable insert is disposed within wind tunnel nozzle walls with a portion of the flow boundary layer being bled off from the tunnel via passageway and tunnel exit to reduce the extent of separated flow normally occuring upstream of the insert contraction section.

Official Gazette of the U.S. Patent and Trademark Office

N82-11089 Royal Aircraft Establishment, Bedford (England). Library.
ADAPTATION OF A TURBINE TEST FACILITY TO HIGH-TEMPERATURE RESEARCH
J. Francois, Y. LeBot, J. Michard, and P. Deguest Dec. 1980 30 p refs Transl. into ENGLISH from AGARD Conf. Proc. No. 229, Ankara, Sept.
(RAE-Lib-Trans-2064; BR78650) Copyright. Avail: Issuing Activity

A facility for research on a high temperature (1800 K) and high pressure (4.5 bar) turbine stage is described. The turbine operates in a realistic engine environment and is comprehensively instrumented to permit wide variation of mainstream and coolant flow parameters. The development of robust probes for the measurement of turbulence and temperature fluctuations and optical pyrometry techniques is described. Results of studies of nozzle guide vane heat transfer coefficients, metal temperatures and film cooling efficiency are presented together with rotor blade surface temperature distributions. The MINOS rig confirmed the validity of turbine design prediction methods by providing performance data to correlate theory, scale model testing and gas turbine engine testing. T.M.

N82-11090*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ALGORITHM FOR MINIMUM-COST SET-POINT ORDERING IN A CRYOGENIC WIND TUNNEL
John S. Tripp Nov. 1981 32 p refs
(NASA-TP-1923; L-14695) Avail: NTIS HC A03/MF A01 CSCL 14B

An algorithm for minimum cost ordering of set points in a cryogenic wind tunnel is developed. The procedure generates a matrix of dynamic state transition costs, which is evaluated by means of a single-volume lumped model of the cryogenic wind tunnel and the use of some idealized minimum-costs, which is evaluated by means of a single-volume lumped model of the cryogenic wind tunnel and the use of some idealized minimum-cost state-transition control strategies. A branch and bound algorithm is employed to determine the least costly sequence of state transitions from the transition-cost matrix. Some numerical results based on data for the National Transonic Facility are presented which show a strong preference for state transitions that consume to coolant. Results also show that the choice of the terminal set point in an open odering can produce a wide variation in total cost. Author

N82-11091# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
DETERMINING THE TRAINING EFFECTIVENESS AND COST-EFFECTIVENESS OF VISUAL FLIGHT SIMULATORS FOR MILITARY AIRCRAFT M.S. Thesis
George Benjamin Mayer, Jr. Jun. 1981 140 p refs
(AD-A104627) Avail: NTIS HC A07/MF A01 CSCL 05/9

The constraint on oil flow from the Middle East as a result of the 1973 war and the increased sophistication of aircraft weapons systems are two important factors which have contributed significantly to the interest in visual flight simulation as an integral part of military flight training. Costs associated with these factors, such as procurement and fuel costs, are providing pressure to the military establishment to improve their capability to provide military pilots with visual flight simulation systems which do not impair combat effectiveness or aviation safety. This thesis describes the results of flight simulation utilization by the commercial airline industry, analyzes the effectiveness realized by using flight simulators to supplement military training in different aviation environments, and outlines methodologies for measuring and improving the cost-effectiveness of the systems. Recommendations for careful study are made in areas that would improve military utilization of flight simulation. Author (GRA)

N82-11092# National Highway Traffic Safety Administration, East Liberty, Ohio. Safety Research Lab.
SIDE IMPACT SLED AND PADDING DEVELOPMENT Final Report, Jun. 1979 - Feb. 1981
Michael W. Monk and Lisa K. Sullivan Feb. 1981 288 p refs
(PB81-217952; DOT-HS-805889; SRL-17) Avail: NTIS HC A13/MF A01 CSCL 13F

A study was conducted to devise and fabricate a HYGE sled buck which could be used to simulate oblique side impact collisions. Once completed the buck was demonstrated by simulating the occupant and side door interactions of two separate laboratory car to car impacts. The degree of success of these two simulations is discussed. Following the simulations, the sled buck was used to select padding materials which appeared promising for occupant protection in side impact collisions. The selection criteria and results are presented. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-11093* National Aeronautics and Space Administration, Washington, D. C.
TECHNOLOGY FOR LARGE SPACE SYSTEMS: A SPECIAL BIBLIOGRAPHY
Jul. 1981 109 p
(NASA-SP-7046(05)) Avail: NTIS HC $11.00 CSCL 22A

This bibliography lists 298 reports, articles, and other documents introduced into the NASA scientific and technical information system between January 1, 1981 and June 30, 1981. Its purpose is to provide helpful, information to the researcher, manager, and designer in technology development and mission design in the area of the Large Space Systems Technology (LSST) Program. Subject matter is grouped according to systems, interactive analysis and design, structural concepts, control systems, electronics, advanced materials, assembly concepts, propulsion, solar power satellite systems, and flight experiments. T.M.

N82-11094*# Athens Coll., Ala.
SPACE PROCESSING OF ELECTRONIC MATERIALS Final Report, 27 Jan. - 20 Aug. 1981
Gary L. Workman and Lawrence R. Holland 28 Sep. 1981 12 p
(Contract NAS8-32920)
(NASA-CR-161892) Avail: NTIS HC A02/MF A01 CSCL 22A

The relative values of thermal conductivity of solid and liquid HgCdTe are critically important in the design configuration of the furnaces used for Bridgman crystal growth. The thermal diffusivity of the material is closely linked to the conductivity by the defining relation D = k/rho c, where D is the diffusivity, K is the thermal conductivity, rho is the density, and c is the specific heat. The use of transient and periodic heating approaches to measure the diffusivity are explored. A system for securing and extracting heat from silica or glass tubes under high C vacuum conditions is described. A.R.H.

N82-11095*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A PROPOSED NEW POLICY FOR PLANETARY PROTECTION
J. B. Barengoltz, S. L. Bergstrom, G. L. Hobby, and P. D. Stabekis (Exotech. Inc.) 15 Sep. 1981 82 p refs
(Contract NAS7-100)
(NASA-CR-164947; JPL-Pub-81-90) Avail: NTIS HC A05/MF A01 CSCL 22A

A critical review of the present policy was conducted with emphasis on its application to future planetary exploration. The probable impact of recent data on the implementation of the present policy was also assessed. The existing policy and its implementation were found to: be excessive for certain missions (e.g., Voyager), neglect the contamination hazard posed by the bulk constituent organics of spacecraft, be ambiguous for certain missions (e.g., Pioneer Venus), and treat all extraterrestrial sample return missions alike. The major features of the proposed policy are planet/mission combinations, a qualitative top level statement, and implementation by exception rather than rule. The concept of planet/mission categories permits the imposition of requirements according to both biological interest in the target planet and the relative contamination hazard of the mission type. T.M.

N82-11096*# National Aeronautics and Space Administration, Washington, D. C.
WHERE ARE WE IN THE SPACE WAR?
J. H. Lee Aug. 1981 18 p Transl. into ENGLISH from Monthly, Korea, South Korea, no. 6, Jun. 1981 p 146-155 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76604) Avail: NTIS HC A02/MF A01 CSCL 22A

Space war and the use of laser weapons is addressed. The divergent opinions of American scientists on laser weapons are included. A comparison of the U.S. and Soviet attitudes is made. A proposal for producing a laser directly from sunlight without using solar panels is presented. J.M.S.

N82-11097*# National Aeronautics and Space Administration, Washington, D. C.
HUNGARIAN COSMONAUT IN SPACE
Sep. 1981 100 p Transl. into ENGLISH of "Magyar urhajos a vilagrurben, mtijelenti" Special Edition, 26 May 1980 p 1-31 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76719) Avail: NTIS HC A05/MF A01 CSCL 22A

The selection and training of cosmonauts and the preparation of the first Hungarian for flight on Salyut 36 and its linking with Soyuz 6 are described. Biographical sketches of the crew members, the reasons for different types of wearing different types of spacesuits during flight in the space station, and the experiments conducted are discussed. Photographs are included. A.R.H.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N82-11098*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NONPARAMETRIC IDENTIFICATION OF A CLASS OF NONLINEAR CLOSE-COUPLED DYNAMIC SYSTEMS
F. E. Udwadia and Chin-Po Kuo 1 Oct. 1981 76 p refs
(NASA-CR-164948; JPL-Pub-81-48) Avail: NTIS HC A05/MF A01 CSCL 22D

A nonparametric identification technique for the identification of close coupled dynamic systems with arbitrary memoryless nonlinearities is presented. The method utilizes noisy recorded data (acceleration, velocity and displacement) to identify the restoring forces in the system. The masses in the system are assumed to be known (or fairly well estimated from the design drawings). The restoring forces are expanded in a series of orthogonal polnomials and the coefficients of these polynomial expansions are obtained by using least square fit method. A particularly simple and computationally efficient method is proposed for dealing with separable restoring forces. The identified results are found to be relatively insensitive to measurement noise. An analysis of the effects of measurement noise on the quality of the estimates is given. The computations are shown to be relatively quick (when compared say to the Wiener identification method) and the core storage required relatively small, making the method suitable for onboard identification of large space structures. B.W.

N82-11099*# Rensselaer Polytechnic Inst., Troy, N. Y.
PARAMETER ESTIMATION OF LARGE FLEXIBLE AEROSPACE STRUCTURES WITH APPLICATION TO THE CONTROL OF THE MAYPOLE DEPLOYABLE REFLECTOR
Mark J. Balas 6 Nov. 1981 20 p refs
(Grant NAG1-171)
(NASA-CR-164971) Avail: NTIS HC A02/MF A01 CSCL 22B

Systems such as the Maypole deployable reflector have a

distributed parameter nature. The flexible column and hoop structure and the circular antenna of 30-100 meter diameter which it supports are described by partial, rather than ordinary, differential equations. Progress completed in reduced order modelling andd controller design and digital parameter estimation and control is summarized. Topics covered include depolyment and on-orbit operation; quasi-static (steady state) operation; dynamic distributed parameter system; autoregressive moving average identification; frequency domain procedures; direct or implicit active control; adaptive observers; parameter estimation using a linear reinforcement learning factor; feedback control; and reduced order modeling for nonlinear systems. A.R.H.

N82-11100*# Howard Univ., Washington, D. C. Dept. of Mechanical Engineering.
ON THE SHAPE AND ORIENTATION CONTROL OF AN ORBITING SHALLOW SPHERICAL SHELL STRUCTURE
Peter M. Bainum and A. S. S. R. Reddy 9 Jul. 1981 7 p refs Presented at the Joint IFAC/ESA Symp. on Automatic Control in Space, Noordwijkerhout, The Netherlands, 5-9 Jul. 1981
(Grant NsG-1414)
(NASA-CR-164970) Avail: NTIS HC A02/MF A01 CSCL 22B

A proposed method for controlling the shape and orientation of very large shallow dish type receiver/reflectors to be used in communication, radiometry and in electronic orbital based mail systems involves connecting a rigid light weight dumbell with heavy tip masses to the shell at its apex by a spring loaded double gimballed joint with dampling. To completely damp the system transient motion in all of the important lower frequency modes, an active control system is required. A mathematical model is extended to include the effects of point actuators located at preselected positions on the shell surface. The formulation of the uncontrolled dynamics assumes an a priori knowledge of the frequencies of all the elastic modes to be incorporated within the system model. As an example, three rigid body modes and six elastic modes are included in the model and six actuators are assumed, none of which lies on a nodal line or circle. A.R.H.

N82-11283*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM
M. L. Yeater and D. T. Herrman *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 19-24 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11285*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PIONEERS 6 THROUGH 12 MISSION SUPPORT
R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 32-33 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11303*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM: MAINTENANCE AND OPERATIONS (M&O) STAFFING ESTIMATES
J. P. Goodwin *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 167-174 ref (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11304*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NOCA UPGRADE
G. D. Gould *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 175-179 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11305*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RELOCATION OF THE DEEP SPACE NETWORK MAINTENANCE CENTER
K. F. Beutler *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 180-181 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

N82-11307*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1980
E. B. Jackson and J. W. Hudson (Bendix Field Engineering Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 192-196 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-11101*# Westinghouse Electric Corp., Linthicum Heights, Md.
ATS-5 12 YEAR IN ORBIT EVALUATION
F. J. Kissel and J. Schaffer Sep. 1981 140 p refs
(Contract NAS5-20825)
(NASA-CR-166728) Avail: NTIS HC A07/MF A01 CSCL 22B

The results of the ATS 5 End-of-Life (EOL) tests are presented. Whenever possible, the test data were compared with prelaunch and inflight data. Pertinent memos and other informal documents containing these data are included as appendixes. The EOL tests include communication subsystems tests, power sybsystem tests, and gravity gradient television camera system tests. S.L.

N82-11102*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT: RCA-D/DELTA LAUNCH
18 Nov. 1981 27 p
(NASA-TM-84063; O-492-206-81-04) Avail: NTIS HC A03/MF A01 CSCL 22B

The planned launch of the RCA-D Satcom satellite is described. A Delta 3910 configuration which incorporates an extended long tank Thor booster, nine Castor 4 strap-on motors, a TRW-201 second stage, and an 9-foot fairing will place the spacecraft along a suborbital trajectory. A Thiokol propulsion apogee motor stage will place it in a synchronous transfer orbit. Three days after launch, the spacecraft apogee kick motor will be fired at transfer orbit apogee to circularize its orbit at a geosynchronous altitude of 19,300 nautical miles above the equator at approximately 132 miles west longitude. R.J.F.

N82-11103*# Computer Sciences Corp., El Segundo, Calif.
MAGNETIC FIELD SATELLITE (MAGSAT) DATA PROCESSING SYSTEM SPECIFICATIONS
D. Berman, R. Gomez, and A. Miller Oct. 1980 136 p refs
(Contract NAS5-24391)
(NASA-CR-166737; CSC/TM-80/6214) Avail: NTIS HC A07/MF A01 CSCL 22B

The software specifications for the MAGSAT data processing system (MDPS) are presented. The MDPS is divided functionally into preprocessing of primary input data, data management, chronicle processing, and postprocessing. Data organization and validity, and checks of spacecraft and instrumentation are dicussed. Output products of the MDPS, including various plots and data tapes, are described. Formats for important tapes are presented. Dicussions and mathematical formulations for coordinate transformations and field model coefficients are included. S.L.

N82-11104# Bell-Northern Research Ltd., Ottawa (Ontario).
ELECTROMAGNETIC FIELD MAPPING OF CYLINDER AND MISSILE NOSECONE Final Technical Report, Aug. 1979 - Sep. 1980
Richard R. Goulette and Kent E. Felske Jul. 1981 199 p refs
(Contract F30602-79-C-0197; AF Proj. 2338)

(AD-A104312; RADC-TR-81-179) Avail: NTIS HC A09/MF A01 CSCL 16/3

This technical report describes the technology and instrumentation developed for the measurement of vector electric and magnetic fields with cylindrical configurations, when the configurations are illuminated by a plane electromagnetic wave in the frequency range of 225 to 400 MHz. A set of such contour maps are presented for a missile nosecone and a right circular cylinder illuminated by a 300 MHz planewave. Author (GRA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

No abstracts in this category.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

N82-11289*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SYMBOL ERROR RATE PERFORMANCE EVALUATION OF THE LM37 MULTIMEGABIT TELEMETRY MODULATOR-DEMODULATOR UNIT

H. Malek *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 59-74 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 09F

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-11105*# California Univ., Los Angeles. Inst. of Geophysics and Planetary Physics.

MAGNETIC FIELD INVESTIGATION FOR ISEE MOTHER AND DAUGHTER SPACECRAFT Final Report

C. T. Russell 7 Jun. 1981 4 p refs

(Contract NAS5-20064)

(NASA-CR-166713) Avail: NTIS HC A02/MF A01 CSCL 22B

Highlights of the design and fabrication of fluxgate magnetometers for the ISEE A and B satellites which were launched from a single launch vehicle into the same highly elliptical orbit are presented. The instrument consisted of four basic assemblies: the sensors, the drive and sense electronics, the data handling unit; and the flipper. The digital handling data handling assembly contained a digital filter that mantained a uniform transfer function for all three axes of both spacecraft. Initial studies centered on the bow shock and the magnetopause and show that both boundaries are in rapid motion. The bow shock was found to be very thin, close to an ion inertial length in thickness, but the magnetopause was much thicker than expected, about 400 to 1000 km on average. The magnetometers have each logged over 3 2/3 years of continuous operation. A.R.H.

N82-11106*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TESTING OF A SPACECRAFT MODEL IN A COMBINED ENVIRONMENT SIMULATOR

J. V. Staskus and J. C. Roche 1981 11 p refs Presented at the 18th Ann. Conf. on Nucl. and Space Radiation Effects, Seattle, 20-24 Jul. 1981

(NASA-TM-82723; E-1024) Avail: NTIS HC A02/MF A01 CSCL 22B

A scale model of a satellite was tested in a large vacuum facility under electron bombardment and vacuum ultraviolet radiation to investigate the charging of dielectric materials on curved surfaces. The model was tested both stationary and rotating relative to the electron sources as well as grounded through one megohm and floating relative to the chamber. Surface potential measurements are presented and compared with the predictions of computer modelling of the stationary tests. Discharge activity observed during the stationary tests is discussed and signals from sensing devices located inside and outside of the model are presented. M.G.

N82-11107*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

VOLTAGE GRADIENTS IN SOLAR ARRAY CAVITIES AS POSSIBLE BREAKDOWN SITES IN SPACECRAFT-CHARGING-INDUCED DISCHARGES

N. John Stevens, Hilton E. Mills, and Lisa Orange 1981 10 p refs Presented at the Ann. Conf. on Nucl. and Space Radiation Effects, Seattle, 21-24 Jul. 1981

(NASA-TM-82710; E-1003) Avail: NTIS HC A02/MF A01 CSCL 10B

A possible explanation for environmentally-induced discharges on geosynchronous satellites exists in the electric fields formed in the cavities between solar cells - the small gaps formed by the cover slides, solar cells, metallic interconnects and insulating substrate. When exposed to a substorm environment, the cover slides become less negatively charged than the spacecraft ground. If the resultant electric field becomes large enough, then the interconnect could emit electrons (probably by field emission) which could be accelerated to space by the positive voltage on the covers. An experimental study was conducted using a small solar array segment in which the interconnect potential was controlled by a power supply while the cover slides were irradiated by monoenergetic electrons. It was found that discharges could be triggered when the interconnect potential became at least 500 volts negative with respect to the cover slides. Analytical modeling of satellites exposed to substorm environments indicates that such gradients are possible. Therefore, it appears that this trigger mechanism for discharges is possible. T.M.

N82-11108# Air Force Geophysics Lab., Hanscom AFB, Mass.

THE ANGULAR IMPACT DISTRIBUTION OF CHARGED PARTICLES ATTRACTED TO A CHARGED CYLINDRICAL SPACECRAFT

Arthur L. Besse and Allen G. Rubin 13 May 1981 12 p refs (AF Proj. 7661)

(AD-A104519; AFGL-TR-81-0142; AFGL-ERP-741) Avail: NTIS HC A02/MF A01 CSCL 22/1

The angular distribution of incident particles is obtained for attracted and repelled particles incident on a charged cylindrical spacecraft. The angular distributions are important when backscattering and secondary emission are significant processes. Results are given for planes and spheres as well. Author (GRA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-11109*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CONCEPT FOR A POWER SYSTEM CONTROLLER FOR LARGE SPACE ELECTRICAL POWER SYSTEMS
Louis F. Lollar, John R. Lanier, Jr., and James R. Graves Nov. 1981 15 p refs
(NASA-TP-1939) Avail: NTIS HC A02/MF A01 CSCL 22B

The development of technology for a fail-operatonal power system controller (PSC) utilizing microprocessor technology for managing the distribution and power processor subsystems of a large multi-kW space electrical power system is discussed. The specific functions which must be performed by the PSC, the best microprocessor available to do the job, and the feasibility, cost savings, and applications of a PSC were determined. A limited function breadboard version of a PSC was developed to demonstrate the concept and potential cost savings. A.R.H.

N82-11110*# Boeing Aerospace Co., Seattle, Wash.
STUDY OF ELECTRICAL AND CHEMICAL PROPULSION SYSTEMS FOR AUXILIARY PROPULSION OF LARGE SPACE SYSTEMS. VOLUME 1: EXECUTIVE SUMMARY
W. W. Smith and J. P. Clark Nov. 1981 35 p refs 2 Vol.
(Contract NAS3-21952)
(NASA-CR-165502-Vol-1; D180-25956-3-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 21H

The objective was to determine the direction auxiliary propulsion research and development should take to best meet upcoming needs. The approach used was to define the important electrical and chemical propulsion characteristics in terms of the demands that will be imposed by future spacecraft. Comparison of these desired characteristics and capabilities with those presently available was then used to identify deficiencies. T.M.

N82-11111*# Boeing Aerospace Co., Seattle, Wash.
STUDY OF ELECTRICAL AND CHEMICAL PROPULSION SYSTEMS FOR AUXILIARY PROPULSION OF LARGE SPACE SYSTEMS, VOLUME 2 Final Report
W. W. Smith Nov. 1981 540 p refs 2 Vol.
(Contract NAS3-21952)
(NASA-CR-165502-Vol-2; D180-2595-4-Vol-2) Avail: NTIS HC A23/MF A01 CSCL 21H

The five major tasks of the program are reported. Task 1 is a literature search followed by selection and definition of seven generic spacecraft classes. Task 2 covers the determination and description of important disturbance effects. Task 3 applies the disturbances to the generic spacecraft and adds maneuver and stationkeeping functions to define total auxiliary propulsion systems requirements for control. The important auxiliary propulsion system characteristics are identified and sensitivities to control functions and large space system characteristics determined. In Task 4, these sensitivities are quantified and the optimum auxiliary propulsion system characteristics determined. Task 5 compares the desired characteristics with those available for both electrical and chemical auxiliary propulsion systems to identify the directions technology advances should take. T.M.

N82-11112# Aerospace Corp., El Segundo, Calif.
RANDOM ERROR PROPAGATION ANALYSIS IN THE PLUME DIAGNOSTIC CODE EMABIC
Stephen J. Young Edwards AFB, Calif. AFRPL Jul. 1981 30 p refs
(Contract F04701-80-C-0081; AF Proj. 5730)
(AD-A104495; TR-0081(6623)-2; AFRPL-TR-81-59) Avail: NTIS HC A03/MF A01 CSCL 12/1

The formal theory of linear error propagation is applied to the data smoothing and profile inversion routines of the plume diagnostic code EMABIC. In addition to the normal operation of retrieving the radial temperature and concentration profiles of the plume from measured transverse profiles of emission and absorption, EMABIC can now automatically estimate the accuracy of retrieval from estimates of the experimental random error of the measurements. An application of the method is made for a case previously examined with an empirical error propagation method. The present results are essentially in agreement with those of the previous study. Author (GRA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-11113 Washington Univ., Seattle.
PHYSICAL STUDIES OF AROMATIC METHYLENES Ph.D. Thesis
Daniel Joseph Graham 1981 200 p
Avail: Univ. Microfilms Order No. 8122737

A study of the low lying excited triplet states of aromatic methylenes is presented. The molecular orbitals of diphenylmethylene and its derivatives are examined via the Simple Huckel and Extended Huckel theories. The electronic transitions involving the ppi and p sigma valence and lowest pi^* molecular orbitals are discussed with respect to the anticipated polarizations, intensities, and substituent effects. Similar considerations are also given to the Simple Huckel and Extended Huckel molecular orbitals of fluorenyldene. It was found that the Extended Huckel ordering of the ppi and p sigma valence orbitals of fluorenylidene was opposite to that determined for diphenylmethylene.
Dissert. Abstr.

N82-11114# Ohio State Univ., Columbus. Dept. of Chemistry.
DEVELOPMENT AND OPTIMIZATION OF METHODOLOGIES FOR ANALYSIS OF COMPLEX HYDROCARBON MIXTURES Technical Progress Report, 1 Sep. 1980 - 31 Aug. 1981
R. J. Laub 1981 55 p refs
(Contract DE-AC02-80ER-10554)
(DE81-025875; DOE/ER-10554/7) Avail: NTIS HC A04/MF A01

Rotating-disk thin-layer chromatography techniques were studied and a number of design innovations were explored, implementation of which could result in a separations system which rivals conventional-column lc for pre-analysis fractionation of petroleum. Studies with liquid-chromatographic (lc) columns of conventional dimensions examined the variation of retentions of aromatic hydrocarbon solutes with mobile phases of methanol + water (reversed-phase sorbent) and hexame + isopropyl alcohol (silica sorbent). Microbore reversed-phase column systems were examined from the standpoints of efficiency and analysis times. Optimization of conditions relating to the fabrication and use of open-tubular gc glass-capillary columns continued. Total analysis of a commercial gasoline provided illustration of the ultrahigh resolution available from the resultant column systems. DOE

N82-11115# Sandia Labs., Albuquerque, N. Mex.
SHOCK-INDUCED ORGANIC CHEMISTRY
B. W. Dodson and R. A. Graham 1981 16 p refs Presented at APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024442; SAND-81-1353C; CONF-810684-35) Avail:

NTIS HC A02/MF A01

A wide variety of chemical reactions are known to occur in organic compounds subjected to shock loading. An overview is presented of the evidence that (a) shock loading can cause nonthermal reactions, i.e., reactions which do not take place under equivalent combinations of static temperature and pressure; (b) unique and/or unusual reactions can occur under shock; and (c) reactions can occur in the shock front itself. Rules obtained for reactivity of organic compounds under shock loading are used to address the problem of initiation sensitivity of aromatic explosives. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N82-11116*# TRW Defense and Space Systems Group, Redondo Beach, Calif. Mechanical Engineering Lab.

RADIATION TESTING OF COMPOSITE MATERIALS, IN SITU VERSUS EX SITU EFFECTS Final Report

R. M. Kurland, J. F. Thomasson, and W. C. Beggs Nov. 1981 109 p refs

(Contract NAS1-15848)

(NASA-CR-3475; Rept-351710-6028-UT-01) Avail: NTIS HC A06/MF A01 CSCL 11D

The effect of post irradiation test environments on tensile properties of representative advanced composite materials (T300/5208, T300/934, C6000/P1700) was investigated. Four ply (+ or - 45 deg/+ or - 45 deg) laminate tensile specimens were exposed in vacuum up to a bulk dose of 1 x 10 to the 10th power rads using a mono-energetic fluence of 700 keV electrons from a Van de Graaff accelerator. Post irradiation testing was performed while specimens were being irradiated (in situ data), in vacuum after cessation of irradiation (in vacuo data), and after exposure to air (ex situ data). Room temperature and elevated temperature effects were evaluated. The radiation induced changes to the tensile properties were small. Since the absolute changes in tensile properties were small, the existance of a post irradiation test environment effect was indeterminate. B.W.

N82-11117*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NOVEL IMPROVED PMR POLYIMIDES

Ruth H. Pater 1981 18 p refs Presented at the 13th Natl. SAMPE Tech. Conf., Mt. Pocono, Pa., 13-15 Oct. 1981

(NASA-TM-82733; E-1045) Avail: NTIS HC A02/MF A01 CSCL 11D

A series of N-phenylnadimide (PN) modified PMR polyimide composites reinforced with graphite fibers was investigated. The improved flow matrix resins consist of N-phenylnadimide (PN), monomenthyl ester of 5-norbornene-2, 3-dicarboxylic acid (NE), dimethyl ester of 3,3, 4,4-benzophenonetetracarboxylic acide (BTDE), and 4,4 methylenedianiline (MDA). Five modified PMR resin systems were formulated by the addition of 4 to 20 mole percent N-phenylnadimide to the standard PMR-15 composition. These formulations and the control PMR resin were evaluated for rheological characteristics. The initial thermal and mechanical properties of the PN modified PMR and the control PMR/Celion 6000 composites were determined. The results show that the addition of N-phenylnadimide to PMR-15 significantly improved the resin flow characteristics without sacrificing the composites properties. Concentrations of 4 and 9 mole percent PN appear to improve the thermoxidative stability of PMR composites. A.R.H.

N82-11118*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

THERMAL CONTROL COATINGS BASED ON TRIALKOXY-SILANE HYDROLYSATE BINDERS Patent Application

William J. Patterson and James E. Curry, inventors (to NASA) Filed 28 Aug. 1981 12 p

(NASA-Case-MFS-25620-1; US-Patent-Appl-SN-297487) Avail: NTIS HC A02/MF A01 CSCL 11D

Certain trialkoxysilanes react with water to produce trifunctional monomers, which in turn undergo condensation polymerication to product a 'laddered' silicon resin. The resin is then combined with a selected pigment to provide a mixture suitable for application as a coating. Such coatings have a low absorptance and a high emittance, along with resistance to degradation of reflective and mechanical properties upon prolonged exposure to ultraviolet radiation in vacuum. NASA

N82-11119*# National Aeronautics and Space Administration, Washington, D. C.

THE INDUSTRIAL PROCESSING OF UNIDIRECTIONAL FIBER PREPREGS

B. Laird Jun. 1981 18 p refs Transl. into ENGLISH from Plastiques Renforces, Fibres de Verre Textile v. 19, Jul.-Aug. 1980 p 9-16 Original language document announced as A80-44924 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Ciba-Geigy France, S. A.

(Contract NASw-3199)

(NASA-TM-76599) Avail: NTIS HC A02/MF A01 CSCL 11D

Progress made in the industrial processing of preimpregnated composites with unidirectional fibers is discussed, with particular emphasis on applications within the aerospace industry. Selection of industrial materials is considered. Attention is given to the conditions justifying the use of composites and the properties required of industrial prepregs. The hardening cycle is examined for the cases of nonmodified and polymer modified resins, with attention given to the stabilization of flow, the necessary changes of state, viscosity control, and the elimination of porosity. The tooling necessary for the fabrication of a laminated plate is illustrated, and the influence of fabrication and prepreg properties on the mechanical characteristics of a laminate are indicated. Finally, the types of prepregs available and the processing procedures necessary for them are summarized. S.L.

N82-11120*# National Aeronautics and Space Administration, Washington, D. C.

SILICON CARBIDE AS AN OXIDATION-RESISTANT HIGH-TEMPERATURE MATERIAL. 1: OXIDATION AND HEAT CORROSION BEHAVIOR

J. Schlichting Aug. 1981 11 p Transl. into ENGLISH from Ber. Dtsche. Keram. Ges., West Germany, v. 56, no. 8, 1979 p 196-200 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3199)

(NASA-TM-76608) Avail: NTIS HC A002/MF A01 CSCL 11D

The oxidation and corrosion behavior of SiC (in the form of a SiC powder) and hot-pressed and reaction-bound material were studied. The excellent stability of SiC in an oxidizing atmosphere is due to the development of protective SiO2 coatings. Any changes in these protective layers (e.g., due to impurities, reaction with corrosive media, high porosity of SiC, etc.) lead in most cases to increased rates of oxidation and thus restrict the field of SiC application. Author

N82-11121*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.

OPTICAL FIBER INTERFEROMETER FOR THE STUDY OF ULTRASONIC WAVES IN COMPOSITE MATERIALS Final Report, 1 Oct. 1980 - 30 Sep. 1981

Richard O. Claus, Paul S. Zewekh, Tyson M. Turner, Janet C. Wade, Robert T. Rogers, and A. O. Garg Oct. 1981 98 p refs

(Grant NAG1-68)

(NASA-CR-164916) Avail: NTIS HC A06/MF A01 CSCL 11D

The possibility of acoustic emission detection in composites using embedded optical fibers as sensing elements was investigated. Optical fiber interferometry, fiber acoustic sensitivity, fiber interferometer calibration, and acoustic emission detection are reported. Adhesive bond layer dynamical properties using ultrasonic interface waves, the design and construction of an ultrasonic transducer with a two dimensional Gaussian pressure profile, and the development of an optical differential technique for the measurement of surface acoustic wave particle displacements and propagation direction are also examined. For individual titles, see N82-11122 through N82-11133.

N82-11122*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
OPTICAL FIBER INTERFEROMETER FOR THE STUDY OF ULTRASONIC WAVES IN COMPOSITE MATERIALS, DISCUSSION
In its Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 2-6 refs (For primary document see N82-11121 02-24)
Avail: NTIS HC A06/MF A01 CSCL 11D

Ultrasonic waves in composite materials using optical fiber waveguide as the detecting device were studied. The possibility of using embedded probes in composites for nondestructive evaluation is discussed. It is found that interferometric system is sensitive but requires accurate optical positioning at both fiber input and output. E.A.K.

N82-11123*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DETECTION OF ULTRASONIC WAVES IN SOLIDS BY AN OPTICAL FIBER INTERFEROMETER
Richard O. Claus (Virginia Polytechnic Inst. and State Univ., Blacksburg) and John H. Cantrell, Jr. *In* Va. Polytech. Inst. and State Univ. Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 7-11 refs Repr. from IEEE Ultrasonics Symp., 1980 p 719-721 (For primary document see N82-11121 02-24)
Avail: NTIS HC A06/MF A01 CSCL 11D

An optical fiber interferometer was developed for the detection of ultrasonic waves in solids. The optical paths in both the signal and reference arms of the Mach-Zehnder interferometer are through the cores of similar lengths of single mode fiber mode stripped at both input and output. Instantaneous translation of the pattern is proportional to the localized strain produced by ultrasonic bulk waves generated in the disc and integrated along the fiber path. By spatially filtering the moving fringe pattern and synchronously demodulating the filtered optical intensity distirbution, a signal proportional to the integrated strain is obtained. E.A.K.

N82-11124*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DC CALIBRATION OF THE STRAIN SENSITIVITY OF A SINGLE MODE OPTICAL FIBER INTERFEROMETER
Richard O. Claus (Virginia Polytechnic Inst. and State Univ., Blackburg) and John H. Cantrell, Jr. *In* Va. Polytech. Inst. and State Univ. Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 13-15 refs presented at IEEE Region 3 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)
Avail: NTIS HC A06/MF A01 CSCL 11D

The strain sensitivity of an optical fiber interferometer developed for the detection of pulsed ultrasonic waves in solids was calibrated. Light from the output ends of both fibers was superimposed to form an interference fringe pattern that was interrogated in the far field to give a signal proportional to the differential optical fiber path length. Strain sensitivity is determined by comparing data obtained by clamping and bending the bar at different lengths to simple cantilever beam theory. A minimum theoretical detectable strain of less than 10 to the minus 10th power is indicated. E.A.K.

N82-11125*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
DETECTION OF ACOUSTIC EMISSION IN COMPOSITES BY OPTICAL FIBER INTERFEROMETRY
Janet C. Wade, Paul S. Zerewekhn, and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 17-23 refs Presented at the IEEE Ultrasonic Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

Acoustic emission in prestressed composite panels using embedded single mode optical fiber was detected. Static loading of the composite matrix produces acoustic emission events, pulsed ultrasonic waves, which mechanically modulate the embedded fiber geometry and phase modulate the transmitted optical field. The modulation is detected by optical interferometry and Fourier optical processing techniques to produce an electronic signal proportional to acoustic field amplitude integrated along the length of the fiber in the specimen. Static and dynamic calibration of the detection system is discussed and frequency domain characterization of the acoustic field interaction with the fiber is presented. E.A.K.

N82-11126*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
PULSED-ECHO INTERFACE WAVE CHARACTERIZATION OF BOLTED PLATES
Tyson M. Turner, Richard O. Claus, and Stewart L. Ocheltree *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 25-27 refs Presented at the IEEE Region 2 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

Ultrasonic waves which propagate along the plane boundary separating two solid substrates were used to characterize aluminum and titanium plates adhesively bonded and bolted together. Wave pulses were used to produce interface waves between the aluminum and a Ti-6Al-4V titanium alloy bar by normal mode conversion. Interface wave reflections from bolt holes drilled through the interface were reconverted to surface wave pulses and detected by the same wedge by standard pulse-echo techniques. Time of flight measurements indicate that the reflected waves are a supersonic of longitudinal modes and circularly symmetric waves that propagate around the bolt hole. E.A.K.

N82-11127*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
ATTENUATION OF ULTRASONIC INTERFACE WAVES ON METAL-POLYMER-METAL BOUNDARIES
Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 29-34 refs Presented at the 7th Intern. Conf. on Internal Friction and Ultrasonic Attenuation in Solids, Lausanne, Switzerland, 6-9 Jul. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

The measured sensitivity of interface wave attenuation to defects near the bondline and to variations in the viscosity of the adhesive layer was compared with theoretical changes predicted by the Rokhin model. Differential interferometric optical measurements of interface wave attenuation due to defects near glass polymer metal boundaries are discussed. Pitch catch and pulse echo methods which use variable angle wedge transducers to generate and receive modified interface waves and to measure large bondline defects and adhesive viscosity are described. E.A.K.

N82-11128*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
CHARACTERIZATION OF METAL-POLYMER BOUNDARIES USING STONELEY AND LEAKY WAVES
Richard O. Claus *In its* Opt. Fiber Interferometry for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 36-63 refs Presented at the Intern. Symp. on Physicochem. Aspects of Polymer Surfaces, New York, Aug. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

Optical and acoustooptical techniques for bonded surface inspection and interface wave detection are discussed. Interface wave propagation models based on viscous, elastic, and viscoelastic mechanical properties are reviewed. Gross boundary anomalies such as large defects and localized disbond regions were measured using conventional high frequency pulse echo and pitch catch ultratechniques. Bond durabilty is estimated by comparing detected wave attenuation versus frequency as a function of prebond surface preparation with the experimental limit obtained for perfect welded contact. Sensitivity of interface acoustic field periodicity to both residual and dc applied stress at the boundary surface is observed as well as hysteresis due to viscoelastic polymeric behavior as the applied stress is cycled. E.A.K.

N82-11129*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
WAVES GUIDED BY A THIN VISCOELASTIC LAYER BETWEEN ELASTIC SOLIDS
Richard O. Claus and Robert T. Roges *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 65-69 refs Presented at the IEEE Ultrasonics Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

The propagation of ultrasonic waves guided along a viscoelastic layer which separates two dissimilar elastic solid half spaces is described. For the limiting cases of rigid and soft bonding by a layer thin compared to acoustic wavelength, Stoneley and independent Rayleigh wave characteristic equations, respectively, result. For combinations of layer rigidity and wave length that correspond to guided wave propagation, external cyclic loading of the layer produces mechanical hysteresis and a resulting dynamic change in bond properties. Measurements of velocity hysteresis in an aluminum polymer adhesive aluminum system are described. E.A.K.

N82-11130*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
AN ULTRASONIC TRANSDUCER WITH GAUSSIAN RADIAL VELOCITY DISTRIBUTION c04
Paul S. Zerwekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 71-73 refs Presented at the IEEE Ultrasonics Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

A transducer with a velocity profile which is Gaussian as a function of radius and independent of angle is described. In materials evaluation applications requiring the interrogation of modified far field patterns of an ultrasonic transducer, it is desirable to use a transducer which produces a beam with a Gaussian profile. A computer aided electrode design and calibrated three dimensional interferometric optical and ultrasonic measurements of the far field distribution are presented. E.A.K.

N82-11131*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
OPTICAL DETECTION OF PULSED SURFACE PARTICLE DISPLACEMENTS c04
Paul S. Zewekh and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 78-80 refs Presented at the IEEE Region 3 Conf., Huntsville, Ala., Apr. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

The detection of acoustic surface wave pulses by a wideband differential interferometric laser technique which is insensitive to low frequency noise is described. System bandwidth is determined by the relationship between acoustic wavelength and the variable spacing between two laser probe beams focused on the solid surface which supports the waves. Response to an ideal step function displacement is analyzed and experimental measurements of gated 2.5 MHz pulses generated on an aluminized pyrex plate are discussed. E.A.K.

N82-11132*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIDEBAND OPTICAL MEASUREMENTS OF ULTRASONIC PULSES
Richard O. Claus (Virginia Polytechnic Inst. and State Univ., Blacksburg) and John H. Cantrell, Jr. *In* Va. Polytech. Inst. and State Univ. Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 82-85 refs Presented at the Ultrasonics Intern., Brighton, Engl., Jun. 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS 79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

Calibrated masurements of acoustic surface wave pulses by wide bandwidth differential interferometry are described. By interrogating the interference pattern formed by superimposing two optical beams reflected from the surface at slightly separated points, an output signal proportional to instantaneous surface particle displacement is obtained. Response to ideal propagating step function displacements is analyzed and measurements of gated pulses are described. E.A.K.

N82-11133*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electric Engineering.
DUAL DIFFERENTIAL INTERFEROMETER FOR MEASUREMENTS OF BROADBAND SURFACE ACOUSTIC WAVES c04
Tyson M. Turner and Richard O. Claus *In its* Opt. Fiber Interferometer for the Study of Ultrasonic Waves in Composite Mater. Oct. 1981 p 87-89 refs Presented at the IEEE Ultrasonic Symp., Chicago, 1981 (For primary document see N82-11121 02-24)
(Grant NSF ECS-79-25340)
Avail: NTIS HC A06/MF A01 CSCL 11D

A simple duel interferometer which uses two pairs of orthogonally polarized optical beams to measure both the amplitude and direction of propagation of broadband ultrasonic surface waves is described. Each pair of focused laser probe beams is used in a separate wideband differential interferometer to independently detect the component of surface wave motion along one direction on the surface. By combining the two output signals corresponding to both components, the two dimensional surface profile and its variation as a function of time is determined. E.A.K.

N82-11134# Aerospace Corp., El Segundo, Calif. Lab. Operations.
THERMAL EXPANSION OF METAL MATRIX COMPOSITES
E. G. Wolff 1 Aug. 1981 46 p refs
(Contract F04701-80-C-0081)
(AD-A104680; TR-0081(6950-01)-1; SD-TR-81-56) Avail: NTIS HC A03/MF A01 CSCL 11/4

Metal matrix composites offer numerous options in materials performance over the more conventional resin matrix composites; consequently, it is necessary to obtain a complete data base on this class of materials. In this report are described methods and results of thermal expansion measurements. Because theoretical predictions indicate that very low expansion values can be achieved, there is an interest in related thermal measurements, such as thermal cycling behavior, the effects of internal stresses, and microcracking. In particular, there must be adequate experimental accuracy to measure these quantities as a function of fiber-metal system. The advantages of essentially contactless measurement techniques such as Michelson interferometers are presented, including a lack of restriction on sample size or shape. The special requirements in laser characteristics, optics, gaseous and thermal environments, signal processing, and data reduction needed to describe fully low thermal expansion behavior are outlined. Dimensional changes must be measured with an accuracy on the order of + or - .00000001 m. Since differential thermal strains between fiber and matrix have been found to produce stresses that exceed the transverse strength of resin matrixes, a new acousto-optical technique is employed to study microcracking in metal matrix composites at low temperatures concurrently with coefficient of thermal expansion (CTE) measurements. The instrumentation required to analyze high-frequency signals in laser interferometers is described. Experimental results are presented for B-A1, graphite-A1, SiC/Al and graphite-Mg composites.GRA

N82-11135# Manlabs, Inc., Cambridge, Mass.
PHYSICAL CHARACTERIZATION OF ELECTRONIC MATERIALS Final Technical Report, 3 Jan. 1978 - 30 Sep. 1980
S. Andrew Kulin and E. P. Warekois Jul. 1981 43 p refs
(Contract F19628-78-C-0060; AF Proj. 2306)
(AD-A104494; RADC-TR-81-167) Avail: NTIS HC A03/MF A01 CSCL 11/4

Methods were developed to fabricate samples from the glass preforms used as source materials for fiber optics, and analytical methods were adapted to determine the chemistry of those source materials. The fabrication of oriented specimens of seeds resonators, and cells used for the growth and characterization of hydrothermally grown quartz and some other quartz like crystals is described as well as analytical methods used to obtain data

on the characteristics of material grown in a 'skull-melt' type facility. The evaluation of new semiconductor materials and devices involved Auger analysis of deposited materials of deposited films of semiconductor alloys. The vapor-liquid-vapor-solid equilibrium in the cadmium telluride mercury system was also calculated.
GRA

N82-11136# Naval Postgraduate School, Monterey, Calif.
THE EFFECTS OF JET EXHAUST BLAST IMPINGEMENTS ON GRAPHITE-EPOXY COMPOSITES M.S. Thesis
John Michael Hampey Jun. 1981 134 p refs
(AD-A104622) Avail: NTIS HC A07/MF A01 CSCL 11/4

The effect of jet exhaust blasts on graphite epoxy composites (Hercules 3501-6/AS4) is examined. The material degradation of the composites is determined by means of the short beam shear test. The jet exhaust tests were designed to test the worst case conditions for an F-18 aircraft operating off an aircraft carrier. Results indicate that the composites show no significant property changes if the temperature is maintained at less than 2300 C. At temperatures in excess of these, strength degradation occurs. It was also observed that when strength degradation occurs, obvious discoloration and delamination of the composite are evident.
Author (GRA)

N82-11137# Bendix Corp., Kansas City, Mo.
STRESS RELAXATION OF CELLULAR SILICONE MATERIAL: 1981
J. W. Schneider Sep. 1981 21 p refs
(Contract DE-AC04-76DP-00613)
(DE81-030692: BDX-613-2645) Avail: NTIS HC A02/MF A01

The long-term (10 years) stress relaxation properties of cellular silicone materials at room temperature are under evaluation. Both equilibrium (Union Carbide W-97, random copolymer) and condensation (Union Carbide Y-3976, block copolymer) type base polymers are included. Each material was compounded to yield densities of 0.34 and 0.52 g/cm (3) for thickness of 1.17, 1.52, and 2.54 mm. These density-thickness combinations were compressed to nominal compressions of 20 and 40 percent with nine replicates at each condition. A specially-designed fixture is used to maintain a specific compression on the cellular sample and a universal test machine is used to acquire the load data. Currently, the predicted load retention is between 58 and 66 percent of the original load.
DOE

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics*.

N82-11138 Arizona State Univ., Tempe.
A STRUCTURAL STUDY OF ALUMINOSILICATE GLASSES BY RAMAN SPECTROSCOPY Ph.D. Thesis
Paul Francis McMillan 1981 399 p
Avail: Univ. Microfilms Order No. 8122455

A wide range of glasses in the systems CaO-MgO-SiO2 and CaO-Al2O3-SiO2 were studied. Use of a high temperature solar furnace and its rapid quench facility allowed preparation of samples outwith the normal glass forming regions. The CMS system was examined to investigate the behavior of silicate structures with changing composition. Molecular groups were identified by comparison of glass and corresponding crystal spectra, and by consideration of simple vibrational theory. The results for the alkaline earth silicates were compared with those for corresponding alkali silicate systems, and used to construct a model for the vibrational behavior of these systems.
Dissert. Abstr.

N82-11139 Colorado Univ. at Boulder.
THE USE OF LANTHANIDE CHELATES AS SELECTIVE COMPLEXING SORBENTS FOR GAS CHROMATOGRAPHY Ph.D. Thesis
James Edward Picker 1981 158 p
Avail: Univ. Microfilms Order No. 8122316

A coordination polymer of europium with the empirical formula NaEu2(dished)3NO3x was synthesized and found to be suitable for use as a selective complexing sorbent. Experiments were performed to determine the range of analyte volability over which the sorbent is effective and selective. At selected temperatures, the sorbent can retain very volable donor species while nondonor species with boiling points 200 C higher are not retained. The sorbent was applied to the separation of complex mixtures arising from fragrances, tobacco smoke, urinary metabolites and gasoline decomposition. In each case passing the mixture through the sorbent resulted in separation of the mixture into retained and nonretained fractions. This separation simplified the chromatography needed for analysis, facilitated mass spectral identification, and, in the case of the gasoline decomposition, made analysis of trace levels of oxygenated compounds possible.
Dissert. Abstr.

N82-11140 Illinois Univ. at Chicago Circle, Chicago.
STUDIES OF THE KINETICS AND MECHANISM OF GAS-SURFACE REACTIONS ON METAL AND METAL OXIDE SURFACES Ph.D. Thesis
Pin Ho 1981 179 p
Avail: Univ. Microfilms Order No. 8120566

The coadsorption of SO2 and CO on Pt is studied by using flash desorption mass spectrometry and auger electron spectroscopy. Sulfur dioxide chemisorbs on clean Pt with an initial sticking probability of unity and with at least three first order, coverage independent binding states with E sub d of 7, 11 and 23 kcal/mole respectively. Carbon monoxide adsorbs on clean Pt with an initial sticking probability of 0.6 and with at least two first order and coverage dependent binding states with E sub d around 18 and 22 kcal/mole respectively. In the coadsorption experiments, the surface reaction proceeds between the adsorbed species to form a complex which dissociates to form CO2 and sulfur. The sulfur diffuses into the bulk of the Pt foil. The complex formation modifies the surface bonding. The E sub d for CO is decreased while the E sub d of the two low temperature binding states for SO2 are increased.
Dissert. Abstr.

N82-11141 Kent State Univ., Ohio.
ADSORPTION OF MIXED LIQUIDS AND SOLIDS FROM WATER SOLUTION ONTO ACTIVATED CARBON Ph.D. Thesis
Mick Greenbank 1981 486 p
Avail: Univ. Microfilms Order No. 8121089

Adsorption was investigated for the following kinds of mixed organic solutes: binary and ternary liquids with complete mutual miscibility, limited miscibility with water, and comparable refractive indices; binary liquid mixtures exhibiting wide differences in refractive index; one binary liquid system (bromoform-molten p-nitrophenol) with limited mutual miscibility; binary liquid solid systems in which the liquid is more strongly adsorbed, including both solid from relatively concentrated liquid and liquid from relatively concentrated solid solution; binary liquid solid systems with solid more strongly adsorbed, including liquids from solutions of solids and solids from solutions of liquids; and one ternary system (1-pentanol-ethyl acetate-coumarin) of two liquids and one solid. The data were compared with the predictions of the ideal adsorbate (IAS) model of Radke and Prausnitz (for which the Polany model leads to improved convenience in calculation) and of several Polanyian based models.
Dissert. Abstr.

N82-11142 Miami Univ., Fla.
THE VOLUMES AND HEAT CAPACITIES OF NONELECTROLYTES AND ORGANIC ELECTROLYTES IN METHANOL AT 25 C Ph.D. Thesis
Raymond Nicholas French 1981 181 p
Avail: Univ. Microfilms Order No. 8121110

A flow heat capacity calorimeter and a flow vibrating tube densimeter was used to measure the apparent molar heat capacities and volumes of 40 nonelectrolytes and 3 organic electrolytes. These quantities were extrapolated to infinite dilution to obtain the standard partial molal heat capacities and volumes. Plots of the Cp sub 2(0) and V sub 2(0) with the number CH2

group which was found to be constant for all four series.
Dissert. Abstr.

N82-11143 Georgetown Univ., Washington, D.C.
VIBRATIONAL SENSITIZATION OF OF 14N14NO, 15N14NO AND H2O BY LASER EXCITED SF6 Ph.D. Thesis
Asghar Fakhr 1981 257 p
Avail: Univ. Microfilms Order No. 8122465

Fluorescence from N-14 N-14O, N-15 N-14O and H2O molecules as probes in mixtures of each of these species with SF6 was monitored following excitation of the SF6 by a CO2 laser pulse. The fluorescence monitors the availability of input energy in the vibrational states of SF6 and the time scale on which this energy can excite states in probe molecules. Rapid, selective, collision-dependent excitation of N-14N-14O by vibrationally excited SF6 was observed. The time dependence of the N-14N-14O fluorescence at 4.5 micrometers consists of three distinct phases. A very rapid rise depends on the pressure of each component and is dominated by the SF6 dependent contribution of 2290 m sec N-14n-14O torr(SF6). The N-14N-14O contribution to the observed rise-rate is 65 m sec N-14N-14O. Subsequently, the second phase is a rapid fall in the fluorescence intensity governed by V to V processes that redistribute the energy among the SF6 vibrational modes with a rate of 644 m sec N-14N-14O torr(SF6). Finally a slow V to T,R process is observable as the residual fluorescence, after the rapid rise and initial fall.
Dissert. Abstr.

N82-11144* National Aeronautics and Space Administration. Pasadena Office, Calif.
FLUIDIZED BED COAL COMBUSTION REACTOR Patent
Philip I. Moynihan (JPL, California Inst. of Technology, Pasadena) and Donald L. Young, inventors (to NASA) (JPL, California Inst. of Technology Pasadena) Issued 8 Sep. 1981 7 p Filed 15 Dec. 1978 Supersedes N79-14388 (17 - 05, 0601) Sponsored by NASA
(NASA-Case-NPO-14273-1; US-Patent-4,287,838; US-Patent-Appl-SN-969759; US-Patent-Class-110-234; US-Patent-Class-110-255; US-Patent-Class-110-266; US-Patent-Class-110-245; US-Patent-Class-122-4D) Avail: US Patent and Trademark Office CSCL 21B

A fluidized bed coal reactor includes a combination nozzle-injector ash-removal unit formed by a grid of closely spaced open channels, each containing a worm screw conveyor, which function as continuous ash removal troughs. A pressurized air-coal mixture is introduced below the unit and is injected through the elongated nozzles formed by the spaces between the channels. The ash build-up in the troughs protects the worm screw conveyors as does the cooling action of the injected mixture. The ash layer and the pressure from the injectors support a fluidized flame combustion zone above the grid which heats water in boiler tubes disposed within and/or above the combustion zone and/or within the walls of the reactor.
Official Gazette of the U.S. Patent and Trademark Office

N82-11145*# Jet Propulsion Lab., California Inst of Tech., Pasadena.
COAL DESULFURIZATION BY LOW TEMPERATURE CHLORINOLYSIS, PHASE 3 Technical Report, 1 Mar. 1980 - 1 Mar. 1981
John Kalvinskas, Naresh Rohatgi, and John Ernest 1 Mar. 1981 170 p refs Sponsored by NASA
(Contract DE-AI01-77ET-12547)
(NASA-CR-164957; JPL-Pub-81-82; DOE/ET-12547/1) Avail: NTIS HC A08/MF A01 CSCL 07D

Laboratory scale, bench scale batch reactor, and minipilot plant tests were conducted on 22 bituminous, subbituminous, and lignite coals. Chemical pretreatment and post treatment of coals relative to the chlorination were tried as a means of enhancing desulfurization by the chlorinolysis process. Elevated temperature (500-700 C) hydrogen treatment of chlorinolysis-processed coal at atmospheric pressure was found to substantially increase coal desulfurization up to 90 percent. Sulfur forms, proximate and ultimate analyses of the processed coal are included. Minipilot plant operation indicates that the continuous flow reactor provides coal desulfurization results comparable to those obtained in the batch reactor. Seven runs were conducted at coal feed rates of 1.5 to 8.8 kg per hour using water and methylchloroform solvents, gaseous chlorine feed of 3 to 31.4 SCFH at 21 to 70 C, and atmospheric pressure for retention times of 20 to 120 minutes.
Author

N82-11146*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ASSESSMENT OF ADVANCED COAL GASIFICATION PROCESSES
John McCarthy, Joseph Ferrall, Thomas Charng, and John Houseman Jun. 1981 200 p refs Sponsored in part by DOE and JPL
(Contracts NAS7-100; DE-AI21-77ET-13032; JPL Proj. 5030-470)
(NASA-CR-164949; JPL-Pub-81-45; DOE/ET-13032/2) Avail: NTIS HC A09/MF A01 CSCL 07D

A technical assessment of the following advanced coal gasification processes is presented: high throughput gasification (HTG) process; single stage high mass flux (HMF) processes; (CS/R) hydrogasification process; and the catalytic coal gasification (CCG) process. Each process is evaluated for its potential to produce synthetic natural gas from a bituminous coal. Key similarities, differences, strengths, weaknesses, and potential improvements to each process are identified. The HTG and the HMF gasifiers share similarities with respect to: short residence time (SRT), high throughput rate, slagging, and syngas as the initial raw product gas. The CS/R hydrogasifier is also SRT, but is nonslagging and produces a raw gas high in methane content. The CCG gasifier is a long residence time, catalytic, fluidbed reactor producing all of the raw product methane in the gasifier.
S.L.

N82-11147*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
STATIC CONTINUOUS ELECTROPHORESIS DEVICE Patent Application
Percy H. Rhodes, inventor (to NASA) Filed 6 Oct. 1981 19 p
(NASA-Case-MFS-25306-1; US-Patent-Appl-SN-309293) Avail: NTIS HC A02/MF A01 CSCL 07D

A separation chamber which includes a pair of spaced opposed moving walls which entrain the fluid to flow as a rigid body with minimized distortion and spaced opposed side walls is carried within a water-tight enclosure housing which contains the electrolytic buffer solution. A pair of substrate assemblies include opposed front substrate walls facing the separation chamber. Endless traveling belts are carried by the substrate assemblies defining the moving wall structure. By means of a vacuum which communicates with the front substrate walls through vacuum ports, the traveling belts are held positively sealed against the substrate walls so as to avoid and prevent leakage behind the belts. The walls are prevented from bowing. The moving belts are covered with a thin layer of low zeta-potential covering coating material such as methylcellulose with is advantageous in reducing the electroosmosis effect.
NASA

N82-11148# Babcock and Wilcox Co., Alliance, Ohio. Research and Development Div.
COMPUTATIONAL TOOLS FOR PULVERIZED-COAL COMBUSTION Quarterly Report, Mar. - Jun. 1981
W. J. Oberjohn, W. Fiveland, D. K. Cornelius, J. H. Wang, and R. J. Schnipke Jul. 1981 144 p refs
(Contract DE-AC22-81PC-40265)
(DE81-028582; DOE/PC-40265/1; QR-1) Avail: NTIS HC A07/MF A01

A computer code capable of modeling the major aspects of pulverized coal combustion was developed. The combustion model (COMO) consists of a number relatively independent modules that represent the major processes involved in pulverized coal combustion. Version one of COMO is used primarily to determine a satisfactory means of integrating the numerical models of the combustion processes into an overall combustion model. Detailed task descriptions were prepared, literature searches conducted, and process models selected for version one. The formulation and coding of the models was initiated and, in some cases, comparisons with data and other predictions were made. Code development guidelines were prepared and reviewed. The guidelines present the information required to allow process modules to be developed relatively independently, while providing

for the subsequent integration of these modules into COMO. DOE

N82-11149# Battelle Pacific Northwest Labs., Richland, Wash.
TECHNIQUES FOR GEOTHERMAL LIQUID SAMPLING AND ANALYSIS
C. H. Kindle and E. M. Woodruff Jul. 1981 102 p refs
(Contract DE-AC06-76RL-01830)
(DE81-030151; PNL-3801) Avail: NTIS HC A06/MF A01

A methodology was developed that is particularly suited to liquid-dominated resources and adaptable to a variety of situations. It is intended to be a base methodology upon which variations can be made to meet specific needs or situations. The approach consists of recording flow conditions at the time of sampling, a specific insertable probe sampling system, a sample stabilization procedure, commercially available laboratory instruments, and data quality check procedures. DOE

N82-11150# Oak Ridge Y-12 Plant, Tenn. Development Div.
SURFACE ANALYSIS BY FOURIER TRANSFORM INFRARED (FTIR) SPECTROSCOPY
G. L. Powell, N. R. Smyrl, and E. L. Fuller 12 Aug. 1981 32 p refs
(Contract W-7405-eng-26)
(DE81-025741; Y/DU-192) Avail: NTIS HC A03/MF A01

A diffuse-reflectance capability for the Fourier transform infrared spectrometer at the Y-12 Plant Laboratory was implemented. A sample cell with a 25 to 400 C temperature-controlled sample stage and an ultrahigh-vacuum-to-atmospheric pressure gas-handling capability was developed. Absorbance of light from the spectrometer beam, resulting from the beam being scattered from a powder sample, can be measured. This capability of detecting molecular species on and in powders is to be used to compounds. Cell design is described along with experiments demonstrating its performance in detecting moisture absorption on uranium oxide, moisture and carbon dioxide absorption on the lithium hydride/hydroxide system, and carbon dioxide absorption on potassium borohydride. DOE

N82-11151# Oak Ridge National Lab., Tenn. Engineering Div.
TENNESSEE VALLEY AUTHORITY ATMOSPERIC FLUIDIZED-BED COMBUSTOR SIMULATION Interim Annual Report, 1 Jan. - 31 Dec. 1980
J. W. Wells, M. H. Culver (Georgia Inst. of Technology), and R. P. Krishman Sep. 1981 263 p refs
(Contract W-7405-eng-26)
(DE81-030262; ORNL/TM-7847) Avail: NTIS HC A12/MF A01

The development of a steady-state mathematical model with the capability of predicting trends in bed performance under various feed and operating conditions is discussed. Three additional predictive subcodes were developed: the SO2 capture subcode, the NO/sub x/ emissions subcode, and the freeboard subcode. The following subcodes were combined to form an overall simulation code of the AFBC bed: (1) bubble growth subcode; (2) elutriation-attrition subcode; (3) coal combustion subcode; (4) SO2 capture subcode; and (5) NO/sub x/ emissions subcode. An energy balance routine was added to the combined code. The resulting overall bed simulation is capable of predicting how some of the important operating variables affect AFBC's performance. The freeboard model was combined with the overall bed simulation and is currently being debugged. DOE

N82-11152# Illinois Univ. at Chicago Circle, Chicago.
VERTICAL COMBUSTOR FOR REFUSE COMBUSTION
Paul M. Chung Jun. 1981 64 p refs Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE81-030002; ANL/CNSV-TM-80) Avail: NTIS HC A04/MF A01

A vertical combustor for refuse-particle combustion was analyzed for waste-to-energy recovery. A one dimensional model was constructed that consisted of fuel particles, inert solid particles, and the gaseous mixture. The gaseous mixture was divided further into six chemical species that are involved in combustion at temperatures below about 2000 F. It was concluded that such combustors may be viable in the United States since US refuse contains large amounts of volatile matter. Combuston of the relatively small char, however, may not be cost-effective in the present combustor where the fuel residence time is on the order of 2 s for a combustor height of 20 to 30 ft. A computer solution was designed to optimized a given combustor system. A simplified version of the solution was programmed for a TI-59 programmable hand calculator for field use. DOE

N82-11153# Stanford Univ., Calif. Petroleum Research Inst.
ALGORITHM FOR COMPUTING IN-SITU COMBUSTION OIL RECOVERY PERFORMANCE
Mohammad R. Fassihi, Brian D. Gobran, and Henry J. Ramey, Jr. Oct. 1981 29 p refs
(Contract DE-AC03-76ET-12056)
(DE81-030340; DOE/ET-12056/25; SU-SUPRI-TR-25) Avail: NTIS HC A03/MF A01

An algorithm was developed to estimate the in-situ combustion performance in the field. A calculator program was prepared using this algorithm. The program is efficient, simple and accurate. Given estimates of fuel concentration, air/fuel ratio, gas and oil saturations, and injection rate, for each volume burned, oil recovery, air requirement, and time may be calculated. DOE

N82-11154# Massachusetts Inst. of Tech., Oak Ridge, Tenn. School of Chemical Engineering Practice.
ALUMINUM RECOVERY FROM FLY ASH AND SHALE-RETORT WASTES
J. L. Plawsky, R. K. Helling, and M. E. Tsui Jul. 1981 72 p refs
(Contract W-7405-eng-26)
(DE81-027675; ORNL/MIT-331) Avail: NTIS HC A04/MF A01

The sparge-crystallization step in a proposed process for aluminum recovery from fly ash was studied. The effect of various feeds and HCl concentration on the solubility of six metal ions was investigated, and the yield and purity of the crystals obtained. Significant improvements in data consistency were obtained over previous work on this system. Multistage crystallization and washing will be necessary to achieve removal of K and Mg to meet product specification. The replacement of ferric ion with ferrous ion produced an increase in Mg solubility, leading to the conclusion that more work is required with ferrous feeds and with multistage crystallizations. Experiments with leachate from oil-shale-retort residues produced 99.87% aluminum purity. A predictive correlation proposed by Meissner was used to predict solubilities of pure and mixed salts in hydrochloric acid solutions. Modification of the correlation's parameters yielded excellent agreement with theory for the AlCl3-HCl system. DOE

N82-11155# Hydrogen Consultants, Inc., Denver, Colo.
HYDRIDE CHEMICAL COMPRESSOR, PHASE 1 Final Report
F. E. Lynch, R. A. Nye (Denver Research Inst.), and P. P. Turillon (ERGENICS) Jan. 1981 43 p refs Prepared for Brookhaven National Lab.
(Contract DE-AC02-76CH-00016)
(DE81-030199; BNL-51369) Avail: NTIS HC A03/MF A01

A proof-of-concept, bench-size hydride chemical compressor consists of two electrically heated tube bundles each containing 15 kg of hydriding alloys. The tube bundles are alternately heated and cooled in order to provide continuous output of high pressure hydrogen. Electrical resistance heating was selected for ease of demonstration and testing. In continuous operation, the compressor delivered 20.3 liters/min (43 SCFH) of hydrogen at a pressure of 42.2 atmospheres (650 psia). A step-by-step analysis of the parameters affecting overall efficiency shows that the major factors are the thermal mass of the system, the fraction of hydride decomposed at high temperature, and the losses by radiation and thermal convection. DOE

N82-11156# Tufts Univ., Medford, Mass. Dept. of Chemical Engineering.
STUDIES FOR THE STABILIZATION OF COAL-OIL MIXTURES Final Report, Aug. 1978 - May 1981
G. D. Botsaris, Y. M. Glazman, and M. Adams-Viola 1981 436 p refs
(DOE/ET-10746/T1) Avail: NTIS HC A19/MF A01

A fundamental understanding of the stabilization of coal-oil mixtures (COM) was developed. Aggregation of the coal particles was determined to control both the sedimentation and rheological propeties of the COM. The wettability of coal powders was evaluated by the Pickering emulsion test and spherical agglomeration test to assess its effect on the stability of various COM formulations. Sedimentation stability of hydrophilic coal-oil-water mixtures (COWM) involves the formation of water bridges between the coal particles, while less stabilization of oleophilic COWM is achieved by the formation of an emulsion. Anionic surface active agents (SAA) were least sensitive to the coal type and enhanced the aggregation stability of the suspension. The effect of cationic SAA, nonionic SAA and polymer additives depended upon the specific chemical structure of the SAA, the water content of the COM, and the type of coal. The sedimentation stability of ultrafine COM was not directly due to the fineness of the powder but due to the formation of a network of floculated particles. DOE

N82-11157# Oak Ridge National Lab., Tenn.
SCIENTIFIC INNOVATION AND RESONANCE IONIZATION SPECTROSCOPY
C. R. Richmond 1981 16 p refs Presented at Symp. on Resonance Ionization Spectry. and its Appl., Gatlinburg, Tenn., 2 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023193; CONF-810668) Avail: NTIS HC A02/MF A01

An account is presented of the development and applications of resonance ionization spectroscopy and one atom detection. The process of technology transfer is examined. DOE

N82-11158# Polytechnic Inst. of New York, Farmingdale. Aerodynamics Labs.
ONE-DIMENSIONAL EQUILIBRIUM-CHEMISTRY FLOW MODEL FOR COAL COMBUSTORS
P. M. Sforza, M. Smorto, and W. Peter May 1981 108 p refs
(Contracts DE-AC01-78ET-11056; ET-78-C-01-3084)
(DE81-027622; DOE/ET-11056/T5; POLY-M/AE-81-8) Avail: NTIS HC A06/MF A01

A quasi one dimensional steady flow analysis for high temperature coal combustors was developed. Results for the case of global heat release based on fuel heating value were compared to those obtained with a finite rate chemical reaction combustor analysis and reasonable agreement between the two was demonstrated. An existing chemical equilibrium computer code was then coupled to the one dimensional gas dynamic code to improve the accuracy of the required thermodynamic and chemical input data; the coupled code is called COMBUSTOR. The second stage or a coal fired MHD combustor designed for large scale operation was modeled by means of the COMBUSTOR code for cases with and without heat transfer, and for varying amounts of potassium carbonate seed injection. Results for combustor exit temperature, composition, velocity, and electrical conductivity from the model are shown to agree well with those obtained in the operational combustor. DOE

N82-11159# Rockwell International Corp., Golden, Colo. Energy Systems Group.
AUTOMATION OF ELECTRON DIFFRACTION ANALYSIS IN AN ANALYTICAL ELECTRON MICROSCOPE
M. J. Carr Jul. 1981 17 p refs Presented at 16th Ann. Conf. of the Microbeam Analysis Soc., Vail, Colo., 13 Jul. 1981
(Contract DE-AC04-76DP-03533)
(DE81-027255; RFP-3188; CONF-810705-6) Avail: NTIS HC A02/MF A01

The concept of gathering and analyzing electron diffraction patterns in an AEM by using a computer to digitally control the operation of a set of post-projector lens scan coils is outlined. By digitally controlling the deflection of a static selected area diffraction pattern either to a fixed reference point or in a reduced raster over the apertured STEM detector, a set of electronic signals may be generated which contain information of the form I = f(x,y). Not only can this signal be rapidly processed to provide realtime analyses of diffracted distances and angles of spots in the pattern, but also the operator maintains control over the scanning coils (via joystick) allowing only selected spots to be gathered and analyzed, thus facilitating the analysis of imperfect multiple patterns. The hardware and software are described and preliminary results and current limitations are discussed. DOE

N82-11160# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
SUBMICRON-PARTICLE ABSORPTION SPECTROSCOPY BY PHOTOTHERMAL MODULATION OF MIE SCATTERED LIGHT
A. J. Campillo and H. B. Lin 1981 4 p refs Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025096; BNL-28979; CONF-810613-7) Avail: NTIS HC A02/MF A01

In situ particle specific absorption spectroscopy is performed using a CO2 laser to photothermally modulate visible MIE scattered light. This scheme is appropriate for ambient sulfate particulate analysis. DOE

N82-11161# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
BRAGG CURVE SPECTROSCOPY
C. R. Gruhn May 1981 27 p Presented at the INS Intern. Conf. on Radiation Detectors, Tokyo, 23-28 Mar. 1981
(Contract W-7405-eng-48)
(DE81-025827; LBL-12678; CONF-810351-3) Avail: NTIS HC A03/MF A01

An alternative utilization is presented for the gaseous ionization chamber in the detection of energetic heavy ions, which is called Bragg Curve Spectroscopy (BCS). Conceptually, BCS involves using the maximum data available from the Bragg curve of the stopping heavy ion (HI) for purposes of identifying the particle and measuring its energy. A detector was designed that measures the Bragg curve with high precision. From the Bragg curve the range from the length of the track, the total energy from the integral of the specific ionization over the track, the dE/dx from the specific ionization at the beginning of the track, and the Bragg peak from the maximum of the specific ionization of the HI are determined. This last signal measures the atomic number, Z, of the HI unambiguously. DOE

N82-11162# Los Alamos Scientific Lab., N. Mex.
NUMERICAL MODEL STUDY OF BURNING AND DETONATION IN SMALL PETN-LOADED ASSEMBLIES
Charles A. Forest Jul. 1981 25 p refs
(Contract W-7405-eng-36)
(DE81-028594; LA-8790) Avail: NTIS HC A02/MF A01

A simple model was used in the 2DL code to calculate the burning and detonation in Robert Dinegar's all-PETN hot-wire assemblies. The model includes: (1) a constant velocity ignition front; (2) conductive X = BP/sup n/ burn of particles behind the ignition front; (3) inertial confinement; and (4) shock initiation of detonation in the assembly transition tube PETN charge. The surface-to-volume ratio of the burning particles and the ignition front velocity were varied in a parameter study of the model. DOE

N82-11163# Oak Ridge National Lab., Tenn. Atomic, Molecular and High Voltage Physics Group.
ELECTRON ATTACHMENT AS A PROBE OF PHOTOIONIZATION PROCESSES IN LIQUID MEDIA
K. Siomos, G. A. Kouroukiis, and L. G. Christophorou 1981 7 p refs Presented at the 2nd Intern. Swarm Seminar, Oak Ridge, Tenn., 22 Jul. 1981
(Contract W-7405-eng-26)
(DE81-026352; CONF-810720-3) Avail: NTIS HC A02/MF A01

The effects of electron attaching additives on the photoionization threshold of pyrene in seven liquid media comprising a dielectric hydrocarbon liquid and an electron attaching additive, A, were studied. The photoionization threshold, I/sub L/, was found to be independent of the dielectric hydrocarbon liquid and the concentration of each A used. On the basis of these data, it is concluded that in the presence of an efficient A at high concentrations, the photoejected electron is captured by A at times shorter than those required for electron solvation (or

any possible trapping by the solvent) and that the photoionization process for a solute molecule in these dielectric liquids is probably completed at times < or = 10 to the -14th power and > or = 10 to the -16th power s and its energetics are rather independent of the bulk properties of these liquids. DOE

N82-11164# AeroChem Research Labs., Inc., Princeton, N. J.
SOOT FORMATION IN SYNFUELS Quarterly Report, 1 Jan. - 31 Mar. 1981
D. B. Olson Aug. 1981 21 p refs Prepared in cooperation with the Pittsburgh Energy Technology Center, Pa.
(Contract DE-AC22-80PC-30304)
(DE81-030273; DOE/PC-30304/2; QR-2) Avail: NTIS HC A02/MF A01

An experimental program is underway to study the effects of molecular structure, pressure, and temperature on soot production in laboratory flames of selected synfuel component hydrocarbons. The objective of Task I is to measure the Threshold Sooting Index, flame temperature, and soot concentration for some 50 fuels in premixed and diffusion flames. During this reporting period a new liquid metered fuel vaporizer was built and tested to replace a boiler-type fuel system that failed to perform adequately. The three wavelength optical probe for measuring emission temperatures and soot concentrations was built and calibrated against a tungsten lamp. Sampling probes for the mass spectrometer being used in Task II for flame structure analysis were tested this period. The 900 stainless steel sampling probes failed due to overheating to 1200 probes were built (with thicker walls and a higher temperature steel alloy). A new electrostatic lens system to focus the flame ions into the mass filter was also built and installed in the apparatus. Author

N82-11165# Gulf Research and Development Co., Pittsburgh, Pa.
INVESTIGATION OF MECHANISMS OF HYDROGEN TRANSFER IN COAL HYDROGENATION Annual Progress Report, Feb. 1980 - Feb. 1981
D. C. Cronauer, R. I. McNeil, D. C. Young, and R. G. Ruberto Jul. 1981 72 p refs
(Contract DE-AC22-80PC-30080)
(DE81-030492; DOE/PC-30080/4) Avail: NTIS HC A04/MF A01

Hydrogen transfer experiments using Powhatan No. 5 bituminous coal (Pittsburgh Seam) and labeled solvents are complete. The liquefaction runs with d4-tetrain were made at temperatures of 300 to 4500 C and at run times of 0, 10 and 30 min; additional runs were made with d12-tetralin at 400 and 4500 C. Product samples were examined by (2)H-NMR to observe the site of deuterium transfer. The relative distribution of deuterium was primarily influenced by reaction temperature and not run time in spite of a major change in the absolute amount of hydrogen transfer with run time. Much of bituminous coal liquefaction occurs during the reactor heat-up time even though a low level of hydrogen transfer occurs. Therefore, the subsequent hydrogen (deuterium) distribution is strongly influenced by up-grading type reactions that occur. Hydrogen/deuterium exchange occurs to a sizable level at the severe conditions of coal liquefaction; this strongly affects the distribution of deuterium in the products. This exchange is enhanced by the pressure of heavy aromatic species and by mineral matter and unconverted coal solids. DOE

N82-11166# Virginia Polytechnic Inst. and State Univ., Blacksburg.
DEVELOPMENT AND APPLICATION OF ANALYTICAL TECHNIQUES TO CHEMISTRY OF DONOR SOLVENT LIQUEFACTION Quarterly Progress Report, Apr. - Jun. 1981
H. C. Dorn and L. T. Taylor Aug. 1981 19 p refs
(Contract DE-AC22-80PC-30041)
(DE81-029125; DOE/PC-30041/T6) Avail: NTIS HC A02/MF A01

On-line IC-(h-1) nmr analysis of coal recycle solvents is presented. This technique is also complimented with a gas chromography-mass spectroscopic analysis of off-line LC fractions. DOE

N82-11167# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
DEVELOPMENT AND APPLICATION OF ANALYTICAL TECHNIQUES TO CHEMISTRY OF DONOR SOLVENT LIQUEFACTION Quarterly Progress Report, Jan. - Mar. 1981
H. C. Dorn and L. T. Taylor Jul. 1981 20 p refs
(Contract DE-AC22-80PC-30041)
(DE81-025961; DOE/PC-30041/T5) Avail: NTIS HC A02/MF A01

The operation of modern superconducting magnet based spectrometers in the liquid chromatography-proton nuclear magnetic resonance spectroscopy (LC-(1)H) NMR mode is fairly simple. In light of the considerable improvements made in this technique, LC-(1)H NMR has shown itself to be quite useful in fuel analysis. The limits of detection are now sufficiently low to be near that of the refractive index detector. Improvements in resolution (both chromatographic and spectroscopic) have made speciation within a class possible. The LC-(1)H NMR technique increases the convenience and reliability of determining the average degree of substitution. Results are reported of runs made on a jet fuel and a model mixture which was prepared by mixing n-butylbenene, m-xylene, tetralin, naphthalene, dodecane, isooctane, n-hexane, nonane, hexadecane and n-pentane. DOE

N82-11168# Air Products and Chemicals, Inc., Allentown, Pa.
CATALYST AND REACTOR DEVELOPMENT FOR A LIQUID-PHASE FISCHER-TROPSCH PROCESS Quarterly Technical Progress Report, 1 Jan. - 31 Mar. 1981
J. W. Brockington, Paul N. Dyer, Ronald Pierantozzi, Barry W. Brian, and Jeffrey V. Bauer Apr. 1981 47 p refs
(Contract DE-AC22-80PC-30021)
(DE81-028209; DOE/PC-30021/T4) Avail: NTIS HC A03/MF A01

The computerized literature search of Fischer-Tropsch literature was continued, refinements in analytical procedures were implemented, the first 300 mL slurry reactor was completed, and catalyst screening tests were begun in the 15 mL gas-phase tubular reactor. Two of ten modified conventional slurry catalysts were prepared. Two batches of one of these catalysts, representing different pretreatment procedures, and a baseline Fischer-Tropsch catalyst were tested in the gas phase reactor. Eight metal cluster catalysts were screened in a gas phase reactor. Construction of the cold flow reactor simulator was completed and initial experiments begun. The persistant foaming problem associated with the use of kerosene as a cold flow liquid was overcome by using a C (9)-C11 isoparaffin mixture instead of kerosene. DOE

N82-11169# Argonne National Lab., Ill. Fossil Energy Program Dept.
MATERIALS TECHNOLOGY FOR COAL-CONVERSION PROCESSES Progress Report, Jan. - Mar. 1981
W. A. Ellingson Jun. 1981 47 p refs
(Contract W-31-109-eng-38)
(DE81-028474; ANL-81-30) Avail: NTIS HC A03/MF A01

Microprobe studies of reaction layers on refractories exposed to a high (20 wt percent) iron oxide acidic coal slag suggest that the amount of iron oxide in the reaction layer immediately adjacent to the slag increases significantly as the chromia content in the refractory increases. Waveguides were installed at the SRC pilot plant to monitor erosive wear. Installation of the ANL-designed erosion scanner at the Exxon Coal Liquefaction Pilot Plant was completed. Nondestructive tests of the HYGAS high-pressure cyclone separator showed that the cyclone internal cone has eroded through in some areas. Evaluation of wear of the METC tar-separator cyclones and solids-separator cyclone continued; the addition of B4C hardfacing has reduced the wear rate in one of the tar cyclones. Preliminary tests were conducted on the capability of an electromagnetic acoustic transducers to measure wall thickness. Work on passive acoustic methods to detect leaks in block valves continued. Work continued to evaluate the effect of combustion gas stoichiometry and deposits on the corrosion behavior of air and steam heat-exchanger tubes. Results indicate that high-chromium alloys such as Type 310 stainless steel exhibit a protective Cr oxide layer in the absence of a deposit. DOE

N82-11170# National Bureau of Standards, Washington, D.C. Center for Thermodynamics and Molecular Science.
SELECTED VALUES OF CHEMICAL THERMODYNAMIC PROPERTIES: COMPOUNDS OF URANIUM, PROTACTINIUM, THORIUM, ACTINIUM, AND THE ALKALI METALS Final Report
D. D. Wagman, W. H. Evans, V. B. Parker, R. H. Schumm, and R. L. Nuttall May 1981 153 p refs
(PB81-223463; NBS-TN-270-8) Avail: NTIS HC A08/MF A01 CSCL 07D

Tables of recommended values for the standard enthalpies (heats) of formation, Gibbs free energies of formation, entropies, enthalpy contents and heat capacities at 298.15 K, and enthalpies of formation at zero K for compounds of uranium, protactinium, thorium, actinium, lithium, sodium, potassium, rubidium, cesium, and francium are given. GRA

N82-11171# Lafayette Coll., Easton, Pa. Dept. of Chemistry.
MANUAL OF ANALYTICAL QUALITY CONTROL FOR PESTICIDES AND RELATED COMPOUNDS IN HUMAN AND ENVIRONMENTAL SAMPLES
Joseph Sherma Apr. 1981 468 p refs
(Contract EPA-68-02-2474)
(PB81-222721; EPA-600/2-81-059) Avail: NTIS HC A20/MF A01 CSCL 07D

A systematic protocol for the quality control of analytical procedures and the problems that arise in the analysis of human or environmental media is provided, as well as a guide to the latest and most reliable methodology available for the analysis of pesticide residues in these and other sample matrices. Inter- and intra-laboratory quality control, the evaluation and standardization of materials used, and the operation of the gas chromatograph are highlighted. Many aspects of the problem areas involved in extraction and isolation techniques for pesticides in various types of samples are discussed. Techniques for confirming the presence or absence of pesticides in sample materials are treated. Gas chromatograph servicing and troubleshooting is covered. The value and need for systematic training programs for pesticide chemists is discussed. GRA

N82-11172# National Bureau of Standards, Washington, D.C. Chemical Thermodynamics Div.
A COMPILATION OF THERMODYNAMIC AND TRANSPORT PROPERTIES OF AQUEOUS SULFURIC ACID
Bert R. Staples and Theresa F. Wobbeking Aug. 1980 27 p
(Contract EW-78-X-03-0509)
(PB81-229171; NBSIR-81-2276) Avail: NTIS HC A03/MF A01 CSCL 07D

A detailed compilation of approximately 200 sources of data for the thermodynamic and transport properties of aqueous sulfuric acid is presented. All ranges of temperature, concentration, and pressure are included. GRA

N82-11173# National Bureau of Standards, Washington, D.C. Chemical Stability and Corrosion Div.
MASS SPECTROMETRIC STUDIES OF MHD SLAG THERMOCHEMISTRY Interim Report
J. W. Hastie and E. R. Plante Jun. 1981 36 p refs
(PB81-221434; NBSIR-81-2293) Avail: NTIS HC A03/MF A01 CSCL 07D

The following potassium-containing systems were studied: binary mixtures of K_2O with SiO_2, Al_2O_3, Fe_2O_3, and ZrO_2; a series of more complex synthetic slags containing K_2O, SiO_2, CaO, MgO, Al_2O_3, and Fe_2O_3; and MHD channel slag (Illinois No. 6 coal); and several slag-NaCl mixtures. Data were obtained over a sufficiently wide range of component-type, composition and temperature to reveal systematic trends in slag activities from which empirical predictions are possible. However, anomalous behavior was also noted, mainly in the form of nonequilibrium effects. Application of the vaporization and activity data to plasma-slag interaction and to the recovery of potassium seed from slag is also considered. GRA

N82-11174# Bureau of Mines, Albany, Oreg.
HIGH-TEMPERATURE ENTHALPY AND X-RAY POWDER DIFFRACTION DATA FOR ALUMINUM SULFIDE (Al_2S)
M. J. Ferrante and R. A. McCune May 1981 17 p refs
(PB81-226250; BM-RI-8526) Avail: NTIS HC A02/MF A01 CSCL 07D

High-temperature enthalphy and X-ray power diffraction studies are conducted on aluminum sulfide (Al_2S_3), to provide data for the advancement of mineral technology consistent with environmental preservation and energy conservation. GRA

N82-11175# Coordinating Research Council, Inc., Atlanta, Ga.
INFORMATIONAL REPORT ON THE MEASUREMENT AND CHARACTERIZATION OF DIESEL EXHAUST EMISSIONS
J. M. Perez, F. J. Hills, D. Schuetzle, and R. L. Williams Dec. 1980 286 p refs
(PB81-221251; CRC-APRAC-CAPI-1-64-517) Avail: NTIS HC A13/MF A01 CSCL 07D

Guidance on selection of methods for collection and analysis of the constituents in diesel exhaust to enable a complete chemical characterization of the exhaust is provided. A thorough review of the state of the art for measuring diesel emissions was prepared. Methods were compiled and their engineering applicability was evaluated. Available methods were reviewed to establish the state of the art. In some cases, sufficient documentation for the use of the method was available in the literature. In other cases, cooperative round-robin testing of the method was conducted and these findings are reported. The methods allow complete assessment of the constituents that are of current interest in diesel exhaust. GRA

N82-11176# Radian Corp., Austin, Tex.
RESPONSE OF PORTABLE VOC ANALYZERS TO CHEMICAL MIXTURES Final Report, Dec. 1980 - May 1981
D. A. DuBose, G. E. Brown, and G. E. Harris Jun. 1981 61 p refs
(Contract EPA-68-02-3171-28)
(PB81-234262; EPA-600/2-81-110) Avail: NTIS HC A04/MF A01 CSCL 14B

The responses of two types of portable volatile organic compounds analyzers, calibrated with methane and used to measure a variety of chemical vapor mixtures, instrument response data for both binary and ternary mixtures of selected chemicals are presented. Various empirical models were evaluated to determine an appropriate method of estimating mixture concentration based, on instrument response. The evaluation concludes that the instrument response for a mixture falls between the response expected for the pure compounds in the mixture. Thus, an interpolation or weighted average model is used to predict the response for mixtures based on known responses for individual chemicals. Both linear and logarithmic weighted average models are applied to the data and present with estimates of accuracy. In general, these models predict the instrument response to within 30% of the observed value. GRA

N82-11177# National Bureau of Standards, Washington, D.C. National Measurement Lab.
ENERGY DISPERSIVE X-RAY SPECTROMETRY: PROCEEDINGS OF A WORKSHOP ON ENERGY DISPERSIVE X-RAY SPECTROMETRY
K. F. J. Heinrich, D. E. Newbury, R. L. Myklebust, and C. E. Fiori (NIH) Jun. 1981 443 p Workshop held at Gaithersburg, Md., 23-25 Apr. 1979 Prepared in cooperation in NIH
(PB81-226334; NBS-SP-604; LC-81-600047) Avail: NTIS HC A19/MF A01 CSCL 14B

A detailed view of the state-of-the-art of energy dispersive X-ray spectrometry is given. The basic of the detection process and applications of the technique to quantitative X-ray microanalysis are discussed. GRA

N82-11178# NUCOR Corp., Denville, N. J.
DETECTION OF OIL IN WATER BY A FLAME EMISSION TECHNIQUE Final Report
Manfred Pragar and Dennis Stainken Jul. 1981 52 p refs
(Contract EPA-68-02-0205)
(PB81-226185; EPA-600/14) Avail: NTIS HC A04/MF A01 CSCL 14B

A flame emission technique and basic instrument design is presented for measuring low concentrations of oil in oil-contaminated water. The flame emission instrument developed would be used as a detector for petroleum oils. The flame emission technique utilizes the selectivity of the hydrocarbon emission signal (at 431 nm) and oil detection is a function of the total

hydrocarbon concentration. Interference of metal ions is avoided by employing steam distillation and condensation techniques to vaporize oil from sample solutions. The prototype instrument successfully detected oil concentrations down to 10 ppm for oils with vapor pressure equal to or higher than No. 4 fuel oils. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-11179 Royal Aircraft Establishment, Bedford (England).
THE QUANTITATIVE DETERMINATION OF NON-METALLIC INCLUSIONS BY A MATHEMATICAL STATISTICAL METHOD
O. V. Rutes, S. B. Maslenkov, S. N. Kabuzenko, and V. V. Topilin Mar. 1981 8 p Transl. into ENGLISH from Kach Stali Splavy (USSR), v. 3, 1978 p 38-42
(RAE-Lib-Trans-2066; BR79866) Copyright. Avail: Issuing Activity

A comparison was made between open arc and vacuum arc melting. The results are shown in terms of the effect on nitride inclusions and on the dispersion of dendritic structures. A statistical analysis of the results was carried out in order to determine whether the results was significant. The heat resistant alloys CrNi56WMoTiAl (EP199) and CrNi67MoWTiAl (EP202) were used in the tests. Author

N82-11180*# National Aeronautics and Space Administration, Washington, D. C.
STUDY OF CERTAIN FEATURES OF THE ELECTRONIC STRUCTURE OF THE TERNARY ALLOYS Ni2(Mn, Fe) AND Ni3(Mn, Co)
V. M. Zhukova and V. P. Fadin Sep. 1981 11 p refs Transl. into ENGLISH from Metallofiz. (USSR), no. 37, 1971 p 18-22 Original language document was announced as A72-35518 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Tomsk State Univ., USSR
(Contract NASw-3199)
(NASA-TM-76620) Avail: NTIS HC A02/MF A01 CSCL 11F

The changes in electronic structure related to transport processes occurring during the alloying of he alloy Ni3Mn with iron and cobalt, and the ordering of the ternary alloys thus formed are presented. The Hall effect, the absolute thermal emf, the internal saturation induction, the Nernst-Ettingshausen constant, and the electrical resistivity were measured. Results show a decrease in the contribution of hole sections of the Fermi surface to the transport process occurs together with a considerable increase in the contribution of electron sections. In this case, the mobility of 3 dimensional holes decreases and the mobility of 4s electrons increases considerably. S.L.

N82-11181*# Kaiser Aluminum and Chemical Corp., Oakland, Calif. Center for Technology.
FLAW GROWTH OF 7075, 7475, 7050 AND 7049 ALUMINUM ALLOY PLATE IN STRESS CORROSION ENVIRONMENTS: 4-YEAR MARINE ATMOSPHERE RESULTS Interim Report
K. R. Hasse and R. C. Dorward 13 Oct. 1981 63 p refs
(Contract NAS8-30890)
(NASA-CR-161887; CFT-RR-81-15) Avail: NTIS HC A04/MF A01 CSCL 11F

After nearly 53 months of exposure to marine atmosphere, crack growth in SL DCB specimens from 7075, 7475, 7050, and 7049-T7X plate has slowed to the arbitrary 10 to the -10 power m/sec used to define threshold stress intensity. Because some specimens appear to be approaching crack arrest, the importance of self-loading from corrosion product wedging as a significant driving force for crack propagation in overaged materials is questioned. Crack length-time data were analyzed using a computer curve fitting program which minimized the effects of normal data scatter, and provided a clearer picture of material performance. Precracked specimen data are supported by the results of smooth specimen tests. Transgranular stress corrosion cracking was observed in TL DCB specimens from all four alloys. This process is extremely slow and is characterized by a striated surface morphology. A.R.H.

N82-11182*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRENDS IN HIGH TEMPERATURE GAS TURBINE MATERIALS
S. J. Grisaffe and R. L. Dreshfield 1981 18 p refs Presented at the 1981 Aerospace Conf., Anaheim, Calif., 5-8 Oct.
(NASA-TM-82715; E-999) Avail: NTIS HC A02/MF A01 CSCL 11F

High performance - high technology materials are among the technologies that are required to allow the fruition of such improvements. Materials trends in hot section components are reviewed, and materials for future use are identified. For combustors, airfoils, and disks, a common trend of using multiple material construction to permit advances in technology is identified. S.L.

N82-11183*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
UNIVERSAL BINDING ENERGY RELATIONS IN METALLIC ADHESION
J. Ferrante, J. R. Smith (General Motors Research Lab.), and J. H. Rose (Ames Lab.) 1981 16 p refs Presented at the Conf. on Aspects Microscopiques de l'Adhesion et de le Lubrication, Paris, 14-18 Sep. 1981
(NASA-TM-82706; E-993) Avail: NTIS HC A02/MF A01 CSCL 11F

Scaling relations which map metallic adhesive binding energy onto a single universal binding energy curve are discussed in relation to adhesion, friction, and wear in metals. The scaling involved normalizing the energy to the maximum binding energy and normalizing distances by a suitable comination of Thomas-Fermi screening lengths. The universal curve was found to be accurately represented by $E^*(A^*) = -(1+\text{beta } A) \exp(-\text{Beta } A^*)$ where E^* is the normalized binding energy, A^* is the normalized separation, and beta is the normalized decay constant. The calculated cohesive energies of potassium, barium, copper, molybdenum, and samarium were also found to scale by similar relations, suggesting that the universal relation may be more general than for the simple free electron metals. R.J.F.

N82-11184*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FAILURE ANALYSIS OF A TOOL STEEL TORQUE SHAFT
John R. Reagan 1981 12 p Presented at the Conf. on Deformation, Fracture, Wear and Nondestructive Evaluation of Mater., New Orleans, 23-24 Nov. 1981; sponsored by Am. Phys. Soc. and Nat. Bureau of Standards
(NASA-TM-82758; E-1077; DOE/NASA/1011-35) Avail: NTIS HC A02/MF A01 CSCL 11F

A low design load drive shaft used to deliver power from an experimental exhaust heat recovery system to the crankshaft of an experimental diesel truck engine failed during highway testing. An independent testing laboratory analyzed the failure by routine metallography and attributed the failure to fatigue induced by a banded microstructure. Visual examination by NASA of the failed shaft plus the knowledge of the torsional load that it carried pointed to a 100 percent ductile failure with no evidence of fatigue. Scanning electron microscopy confirmed this. Torsional test specimens were produced from pieces of the failed shaft and torsional overload testing produced identical failures to that which had occurred in the truck engine. This pointed to a failure caused by a high overload and although the microstructure was defective it was not the cause of the failure. A.R.H.

N82-11185*# National Aeronautics and Space Administration, Washington, D. C.
CERTAIN PHYSICAL PROPERTIES OF COBALT AND NICKEL BORIDES
I. I. Kostetskiy and S. N. L'vov (N. K. Krupskaya Kherson Pedagogical Inst.) Sep. 1981 14 p refs Transl. into ENGLISH from Fiz. Met. Metalloved., USSR, v. 33, Apr. 1972 p 773-780 Original language was announced as A72-40953 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)
(NASA-TM-76623) Avail: NTIS HC A02/MF A01 CSCL 11F

The temperature dependence of the electrical resistivity, the thermal conductivity, and the thermal emf of cobalt and nickel borides were studied. In the case of the nickel borides the magnetic susceptibility and the Hall coefficient were determined at room temperature. The results are discussed with allowance for the current carrier concentration, the effect of various mechanisms of current-carrier scattering and the location of the Fermi level in relation to the 3d band. A.R.H.

N82-11186*# National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF ALLOYING ON AGING AND HARDENING PROCESSES OF STEEL WITH 20% NICKEL
I. N. Bogachev, N. V. Zvigintsev, and T. M. Maslakova Sep. 1981 13 p refs Transl. into ENGLISH from Fiz. Met Metalloved., USSR, v. 33, Feb. 1972 p 362-368 Original language document was announced as A72-30408 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76624) Avail: NTIS HC A02/MF A01 CSCL 11F

Measurements of hardness, thermal emf, and electrical resistance were used to study the effects of Co, Mo, Ti and Al contents on aging and hardening processes in Fe 20%Ni steel. It is shown that the effects of these alloying elements differ substantially. Anomalies which arise in the temperature dependence of physical properties due to the presence of cobalt and molybdenum are reduced by the inclusion of titanium and aluminum (and vice versa). Author

N82-11187# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
LIQUID AND SOLID METAL EMBRITTLEMENT
Norman S. Stoloff 5 Sep. 1981 32 p refs
(Contract N00014-79-C-0583)
(AD-A103048; TR-3) Avail: NTIS HC A03/MF A01 CSCL 11/6

The recent literature on embrittlement induced by solid or liquid metal environments is critically reviewed. Evidence in support of an enhanced shear model of embrittlement is provided for amorphous metals, while decohesion is shown to be a viable concept for crystalline metals. The usefulness of the concept of specificity of embrittlement is questioned on the basis of evidence for new embrittlement couples as the range of experimental conditions is varied. In particular, strain rate and temperture are shown to have extremely important effects on the degree of embrittlement. Author (GRA)

N82-11188# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
ACTIVATION OF SUPERALLOYS AND STAINLESS STEELS FOR CHROMIUM PLATING Final Report
W. Baldauf and E. S. Chen Aug. 1981 20 p refs Presented at the Symp. on Plating on Difficult to Plate Mater. New Orleans, 30-31 Oct. 1980
(DA Proj. 1L1-61102-AH-60)
(AD-A104313; ARLCB-TR-81035) Avail: NTIS HC A02/MF A01 CSCL 11/6

The adhesion of electrodeposited chromium on cobalt, nickel and iron-nickel based superalloys such as Cg-27, Haynes alloy 25, and Udimet 700, as well as stainless steels was investigated. A number of pretreatments were used to activate these alloys. The results show that a hydrofluoric-sulfuric acid pretreatment used anodically produces excellent adhesion. A qualitative adhesion test, named the 'Groove Test' was developed to evaluate the adhesion of thick deposits of chromium on metallic substrates. The development of this test is described. Author (GRA)

N82-11189# Naval Postgraduate School, Monterey, Calif.
FATIGUE CHARACTERISTICS AND MICROSTRUCTURAL ANALYSIS OF THERMOMECHANICALLY-PROCESSED, HIGH-MAGNESIUM ALUMINUM-MAGNESIUM ALLOY M.S. Thesis
Charles A. Cadwell, Jr. Jun. 1981 70 p refs
(AD-A104589) Avail: NTIS HC A04/MF A01 CSCL 20/11

Particular emphasis was placed on study of the microstructural changes which occur during cyclic loading. The study was conducted utilizing a simple binary alloy, Al-10.2 wt pct Mg, and a ternary Al-8.14 wt pct Mg-0.40 wt pct Cu alloy. Both alloys were given similar processing; in particular, both alloys were examined for two rates of quenching to determine the effect of cooling rate from the homogenization temperature on the tensile properties and fatigue characteristics of the alloys. The primary strengthening mechanism in the high-magnesium aluminum-magnesium alloys was determined to be the dislocation substructure developed during warm rolling. In fatigue, the Al-10.2 wt pct Mg alloy appears to exhibit an endurance limit, with a fatigue strength to yield strength ratio in excess of 0.6 in the oil quenched condition. Microstructural refinement achieved through more rapid quenching or through alloying additions was found to degrade the fatigue response although providing improved strength and ductility. Author (GRA)

N82-11190# LaQue Center for Corrosion Technology, Inc., Wrightsville Beach, N.C.
EFFECT OF MECHANICAL CLEANING ON SEAWATER CORROSION OF CANDIDATE OTEC HEAT EXCHANGER MATERIALS. PART 2: TESTS WITH AMERTAP SPONGE RUBBER BALLS
D. G. Tipton Jun. 1981 32 p refs
(Contract W-31-109-eng-38)
(DE81-029953; ANL/OTEC-BCM-018-Pt-2) Avail: NTIS HC A03/MF A01

Corrosion evaluations were conducted on 3003 Alclad, C70600 copper-nickel, and commercially-pure titanium in natural seawater under simulated OTEC heat exchanger conditions to investigate the erosion-corrosion effects of mechanical tube cleaning under aggressive over-cleaning conditions. Test conditions for 3003 Alclad included Amertap soft sponge ball cleaning with and without chlorination, Amertap abrasive sponge ball cleaning with and without chlorination, and no mechanical cleaning as a control. C70600 was exposed to Amertap soft sponge ball cleaning with and without chlorination and with no mechanical cleaning as a control. Titanium was cleaned by abrasive Amertap sponge balls with and without chlorination and compared to no mechanical cleaning as a control. Test exposures of 8, 16, 30, 60, 90 and 180 days were made. The sequence of Amertap sponge ball cleaning utilized in the present tests significantly accelerated corrosion of 3003 Alclad. Chlorination brought about a further acceleration of erosion-corrosion of Alclad. Amertap soft sponge ball cleaning of C70600 caused significant acceleration of corrosion under these over-cleaning conditions. Chlorination somewhat decreased erosion corrosion of C70600. Titanium showed no substantial effect of Amertap abrasive sponge ball cleaning on corrosion, although measurable weight losses were incurred. Chlorination had no measurable effect on erosion-corrosion of titanium. DOE

N82-11191# Hanford Engineering Development Lab., Richland, Wash.
IRRADIATION-INDUCED SWELLING IN COMMERCIAL ALLOYS
J. F. Bates and R. W. Powell Oct. 1980 38 p refs
(Contract DE-AC14-76FF-02170)
(DE81-029755; HEDL-SA-2257-FP) Avail: NTIS HC A03/MF A01

Examination of a wide range of commercial alloys indicates that a minimum in swelling occurs at 40 to 50% nickel. Swelling in these alloys was measured after irradiation to peak fluences of 14.7 x 10(22) n/cm(22) (E > 0.1 MeV) at temperatures ranging from 400 C to 6500 C. The minimum in swelling extends over the full range of irradiation test temperatures. Swelling in the alloys appears to be more sensitive to preirradiation aging treatments than to relative position on the Fe-Cr-Ni ternary diagram. Preirradiation aging of an alloy removes swelling inhibitors from the matrix with a consequent increase in swelling. One of the more important swelling inhibitors removed is carbon. Carbon in solution in the configuration of atomic complexes, which may contain both lattice defects and carbon atoms, can reduce swelling by screening of the dislocation stress fields and hence cause a reduction in the dislocation-interstitial bias factor.

A reduction in swelling with increasing equivalent chromium content was also observed. DOE

N82-11192# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
MICROSTRUCTURE AND PROPERTIES OF DUAL-PHASE STEELS CONTAINING FINE PRECIPITATES
J. S. Gau, J. Y. Koo, A. Nakagawa, and G. Thomas Jul. 1981 19 p refs Sponsored in part by Exxon Research and Engineering Company, Linden, N.J.
(Contract W-7405-eng-48)
(DE81-029946; LBL-12177) Avail: NTIS HC A02/MF A01

Very fine particles (carbides or carbonitrides) of the order of 20 A were extensively examined in the ferrite regions of dual-phase steels subjected to intercritical annealing followed by fast quenching to room temperature. These particles are probably formed during quenching after intercritical annealing. The driving force for the precipitation reaction may arise from the supersaturation of carbon (or nitrogen) in the ferrite phase. These precipitates in certain alloy compositions cause a deviation from the generally observed two phase mixture rule in that the strength of the dual-phase steels having a higher volume fraction of martensite is lower than that having a lower volume fraction of martensite. Thus, the influence of such precipitates must be considered in the structure-property relations of dual-phase steels when fast quenching is employed after intercritical annealing. DOE

N82-11193# Battelle Pacific Northwest Labs., Richland, Wash.
DEPOSITION AND CORROSION PHENOMENA ON ALUMINUM SURFACES UNDER DELUGED DRY COOLING-TOWER CONDITIONS Interim Report
K. R. Wheeler, R. P. May, J. G. Douglas, and J. H. Tylczak Jul. 1981 88 p refs Sponsored in part by Electric Power Research Inst.
(Contract DE-AC06-76RL-01830; EPRI Proj. 422-3)
(DE81-025483; EPRI-CS-1926) Avail: NTIS HC A05/MF A01

Laboratory simulation shows that heat exchanger deposition buildup is linearly dependent on concentration factor and number of wet/dry cycles in the advanced concepts test (ACT) demonstration cooling tower. Deionized water rising after deluge reduced rate of deposition is examined. Technology transferable to ACT shows that deposition from supersaturated solution can be effectively controlled by attention to water chemistry, pH, water conditioning, and good heat transfer design. The additional mechanism of deposition by water film evaporation is effectively managed by soft water rising and uniform surface wetting. Exposure of a model TRANE surface (the ACT wet/dry exchanger) produced short-term deposition extrapolating to 0.011 mm buildup in three years. Studies continue to verify 4X as maximum cycles of concentration through control of water chemistry and rinsing after deluge. Deluge water used at ACT facility is sufficiently aggressive to warrant use of Alclad to extend tube service life. DOE

N82-11194# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Chemistry.
SPECIATION OF LABILE AND QUASI-LABILE METAL COMPLEX SYSTEMS USING THE KALMAN FILTER
Teri F. Brown, Donna M. Caster, and Steven D. Brown May 1981 8 p refs Presented at DOE/NBS Workshop on Environ. Speciation and Monitoring Needs, Gaithersburg, Md., 18 May 1981
(Contract W-7405-eng-48)
(DE81-025678; LBL-12625) Avail: NTIS HC A02/MF A01

Electrochemical techniques used to measure metal complex species have the advantage of sensitivity and specificity, but suffer a number of limitations. For voltammetric techniques, these include requirements of excess ligand and rapid kinetics. An approach to voltammetric studies of metal complexes is introduced which uses the Kalman filter, a recursive, linear, digital filter, to model overlapped electrochemical peaks arising from parallel reduction paths, including the situation where two or more complexes undergo slow exchange. Stability constants are calculated from the individual electrochemical responses extracted by the filter. This approach was applied to studies of the complexation of NTA with various trace metals. The model is described and results for the systems are discussed. DOE

N82-11195# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
DETERMINATION OF EXACT ORIENTATION RELATIONSHIPS BETWEEN MARTENSITE AND AUSTENITE IN STEELS BY MICRODIFFRACTION
M. Sarikaya Mar. 1981 10 p refs Presented at the Electron Microscopy Soc. of Am., Atlanta, 13-17 Aug. 1981
(Contract W-7405-eng-48)
(LBL-12289; CONF-810811-1) Avail: NTIS HC A02/MF A01

In a series of low alloy steels with carbon contents between 0.1 to 0.4 wt%, the existence of retained austenite as thin films (approximately 200 A thick) around the martensite lath boundaries makes it possible to do direct crystallographic analysis between martensite and austenite by microdiffraction. DOE

N82-11196# Brookhaven National Lab., Upton, N. Y.
ADSORPTION OF HYDROGEN ON IRON AND THE HYDROGEN EMBRITTLEMENT OF STEEL
K. Sieradzki and P. J. Ficalora (ORNL) 1981 13 p refs Presented at Intern. Conf. on Environ. Degradation of Engr. Mater., Blacksburg, Va., 21 Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025164; BNL-29672; CONF-810913-4) Avail: NTIS HC A02/MF A01

A model for the chemisorption of hydrogen on iron was developed and the calculated energies of the adsorbed states agree well with observed experimental values. The model is used to explain some of the experimental observations associated with the hydrogen embrittlement of steels. For example, the observed temperature dependence of crack growth rates can be readily interpreted within the framework of the model. The indications are that adsorption may be the key step in the embrittlement process. DOE

N82-11197# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
HYDROGEN DAMAGE IN STAINLESS STEEL
G. R. Caskey, Jr. 1981 32 p refs Presented at Second Intern. Conf. on Environ. Degradation of Engr. Mater., Blacksburg, Va., 21-23 Sep. 1981
(Contract DE-AC09-76SR-00001)
(DP-MS-81-31; CONF-810913-1) Avail: NTIS HC A03/MF A01

Both internal and external hydrogen damage were evaluated by ductility or J-integral under rising tensile loads and by fractography. Analysis of the data emphasized the potential effects of strain-induced martensite on hydrogen damage. Strain-induced martensite was neither necessary nor sufficient for hydrogen damage in the alloys studied. Neither ductility loss nor fracture-mode change correlated generally with martensite formation. Alloy composition, particularly nickel and nitrogen contents, was the primary factor in resistance to hydrogen damage. Thermomechanical processing, however, could alter the degree of hydrogen damage in an alloy and was critical for optimizing resistance to hydrogen damage. DOE

N82-11198# Illinois Univ., Urbana. Dept. of Metallurgy and Mining.
CONTRIBUTION TO THE CHARACTERIZATION OF THE ANELASTIC PROPERTIES OF MULTI-PHASE SYSTEMS
F. M. Mazzolai (1st. di Acustica O. M. Corbino, Rome) 1981 12 p refs Presented at the Intern. Conf. on Internal Friction and Acoustic Attenuation of Solids, Lausanne, Switzerland, Jun. 1981
(Contract DE-AC02-76ER-01198)
(DE81-025581; DOE/ER-01198/1356; CONF-8106105-2) Avail: NTIS HC A02/MF A01

The various kinds of acoustical effects associated with phase transformations were characterized. It is shown that useful distinction can be made between intrinsic and extrinsic effects and that phase transformations involving compositional changes usually involve extrinsic effects. Results described in conference papers are summarized as follows: (1) the structural mechanism of internal friction in Al-Ag (Ic) and Al-Zn (11c) was further clarified; (2) new effects were phenomenologically characterized even if not completely understood; (3) information of physical interest was found on atomic mobilities in alpha-CuZnNi, and on recrystallization of Al-Mg alloys; (4) technologically important

results were obtained on temper-embrittlement of alloying steels, on lattice disruption and precipitation characteristics of hydrides in Nb and V precipitation, on high properties of Al-Zn and of grey cast iron, as well as on the phase separations in (Al2O3)n MgO. DOE

N82-11199# Illinois Inst. of Tech., Chicago.
ACTIVITY AND DIFFUSION OF METALS IN BINARY ALUMINUM ALLOYS M.S. Thesis
Chiang Seng Jao Dec. 1980 77 p refs
(Contract DE-AS02-77ER-04445)
(DE81-025535; DOE/ER-04445/T2) Avail: NTIS HC A05/MF A01

To determine the activity of zinc in Zn-Al alloys, the electromotive force (emf) of the cell: Zn/ZnCl2-KCl(eut)/Zn,Al was measured at temperatures between 569.5 K (296.5C) and 649.5 K(376.5C). The applicability of a two-suffix Margules equation was demonstrated, in good agreement with theoretical expectations. The diffusion coefficient of Zn in Al determined from a planar diffusion model for the experimental data was about 3 x 10 to the -10 power sqcm/sec to 2 x 10 to the -9 power sq cm/sec in the range of temperature studied. This is higher than that found in the literature. The most plausible reason appears to be the high alumina concentration in the working electrode because of partial oxidation. Oxidation of the alloying metals was the primary cause of poor alloying between calcium/or zinc and aluminum, thereby frustrating similar measurements at a Ca-Al/or Zn-Al alloy. The literature on the activity of calcium and zinc with aluminum is reviewed. DOE

N82-11200# Sandia Labs., Albuquerque, N. Mex.
SHOCK COMPRESSION OF BERYLLIUM
J. L. Wise, L. C. Chhabildas, and J. R. Asay 1981 10 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024062; SAND-81-0022C; CONF-810684-25) Avail: NTIS HC A02/MF A01

Shock/reshock and shock/release experiments were performed on beryllium to obtain wave profile measurements spanning the stress range of 6 to 35 GPa. Particle velocity histories in the beryllium samples were determined using a velocity interferometer in conjunction with lithium fluoride windows. The shock velocity-particle velocity response of beryllium was obtained from the interferometer signals, which allowed determination of the Hugoniot for Be over the stress range studied. DOE

N82-11201# Sandia Labs., Albuquerque, N. Mex.
TRAPPING AND SURFACE PERMEATION OF DEUTERIUM IN Fe, Ni AND STAINLESS STEEL: AN ION-BEAM STUDY
S. M. Myers 1981 20 p refs Presented at the Intern. Conf. on Environmental Degradation of Eng. Mater., Blacksburg, Va., 21 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023303; SAND-81-1335C; CONF-810913-2) Avail: NTIS HC A02/MF A01

In He-implanted Fe containing approximately 1 nm He bubbles, D was trapped with an enthalpy of 0.75 + - 0.07 eV, referenced to a solution site. The proposed trapping mechanism is chemisorption on the walls of the bubbles. Deuterium was also bound to implantation defects, hypothesized to be vacancies and vacancy clusters, with enthalpies of 0.5 and 0.7 eV respectively. The permeability of the electropolished and air-exposed Fe surface was characterized by a recombination coefficient of K/sub L/ = to the -14 + - 0.7th power mm to the 4th power/s at a temperature of 500 K. Trapping of D was also observed in Ni and 304 stainless steel implanted with He, the measured binding enthalpy being about 0.5 eV in both cases. Bubble traps similar to those observed in Fe are presumed responsible. No surface-barrier effect was detected for Ni. In contrast, for electropolished and air exposed stainless steel, K/sub L/ < or = 10 to the -19th power mm to the 4th power/s at approximately 500 K. DOE

N82-11202# Lehigh Univ., Bethlehem, Pa.
CRACK ARREST PROPERTIES OF A 9 PERCENT NICKEL CRYOGENIC STEELS Final Report, Jul. 1980 - Feb. 1981
R. D. Stout and A. W. Pense 1 May 1981 88 p refs
(Contract GRI-5080-352-0322)
(PB81-227993; GRI-80/0037) Avail: NTIS HC A05/MF A01 CSCL 11F

A review and analysis of the literature on the fracture toughness of 9% nickel steels with emphasis on the crack arrest properties of these steels applicable to LNG storage vessels is presented. The concept of crack arrest is examined and the merits of the various tests that have been developed to measure crack arrest capability are discussed. The gaps in present knowledge are pointed out and four research programs are suggested to remedy these gaps: (1) the significance of the weld heat-affected zone to crack arrest, (2) correlation of crack initiation and crack arrest tests, (3) characterization of the fracture toughness of modern 9% nickel steels, and (4) the effect of fabrication defects on crack initiaton in 9% nickel steel. A bibliography is included. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-11203 Rensselaer Polytechnic Inst., Troy, N. Y.
EFFECTS OF IONIZING RADIATION ON THE CHEMICAL STRUCTURE, CRYSTALLINE CONTENT AND MOLECULAR WEIGHT DISTRIBUTION OF VARIOUS TEFLON RESINS Ph.D. Thesis
William Keith Fisher 1981 155 p
Avail: Univ. Microfilms Order No. 8121144

Changes in the chemical composition, crystalline content and structure, flow properties and molecular weight distribution in polytetrafluoroethylene (PTFE) after exposure to ionizing radiation are described. The radiation used was 0.8 MeV electrons. The effects of post irradiation annealing on the chemical composition and crystalline content are also analyzed. Radiation induced changes in the chemical composition and the role of oxygen and water vapor in these changes were determined by infrared spectroscopy of PTFE irradiated in ambient air, wet and dry oxygen atmosphere and under vacuum. It was found that when the irradiations are carried out in the presence of oxygen, acid fluoride endgroups are formed and that upon exposure to water vapor, these endgroups undergo hydrolysis to form carboxylic acid endgroups. Infrared absorption bands at 1730 and 1715 cm, which appear most strongly when PTFE is irradiated in a vacuum, were attributed to branch and crosslink formation. Dissert. Abstr.

N82-11204 Case Western Reserve Univ., Cleveland, Ohio.
EPITAXIAL MORPHOLOGIES AND DEPOSITION ENERGETICS OF POLYOXYMETHYLENE Ph.D. Thesis
Charles Maurice Balik 1981 109 p
Avail: Univ. Microfilms Order No. 8118613

Epitaxial crystallization of polyoxymethylene (POM; Delrin D-900) from iodobenzene solution was carried out between 150 C and 165 C on 11 different inorganic substrates. The most interesting results were found on mica, which yielded two different epitaxial morphologies. In one structure, the polymer forms epitaxial rodlike lamellae which exhibit preferential orientation in three directions spaced 60 deg apart. These lamellae are nearly identical with the epitaxial crystals grown on (001) alkali halide substrate surfces, where the chain axis is known to be parallel to the surface and perpendicular to the long axis of the lamellae. The same molecular geometry is assumed to exist for the rodlike epitaxy on mica. Large differences in the nucleation density of rodlike epitaxial crystals, observed over the various substrates are explained in terms of varying degrees of solvent substrate interaction. Results suggest that preferential solvent absorption may account for low polymer nucleation densities on higher surface energy substrates. Dissert. Abstr.

N82-11205# Royal Aircraft Establishment, Bedford (England).
THE EFFECT OF SURFACE TREATMENT OF CARBON FIBRES ON THE STRENGTH PROPERTIES OF CARBON-REINFORCED PLASTICS

G. M. Gunyaev et al Sep. 1980 9 p refs Transl. into ENGLISH from Mekh. Kompozitnykh Materialov (USSR), no. 4, 1979 p 603-606
(RAE-Lib-Trans-2052; BR77976) Copyright. Avail: Issuing Activity

The effect of silicon carbide coating on the shear, bending, stretching, and compression strengths of carbon fibers and epoxy resin 5-211B carbon composites is evaluated. The distribution of the silicon carbide coating over the surface was studies by electron microscopy techniques. It was observed that the surface structure of the original carbon fiber determined the morphology and the strength properties of the material. The inner surface of the SiC film reproduced the characters of the carbon fiber surface while a dense coating was formed along the perimeter of the fiber. There was no change in the dynamic modulus of elasticity of the coated fiber but the strength was dependent on the film thickness. The twisting and the shear characteristics of the carbon fiber increased uniformly with the increase in the thickness of a well bonded film. There was no effect of the SiC coating on the compression strength 5-211B carbon fiber composite for a film of 10 to 30 nm but optimum shear strengths were obtained for a film thickness of 10 to 15 nm. S.L.

N82-11206* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ALUMINUM ION-CONTAINING POLYIMIDE ADHESIVES Patent
Anne K. St.Clair, Larry T. Taylor (Old Dominion Univ.), and Terry L. St.Clair, inventors (to NASA) Issued 18 Aug. 1981 5 p Filed 7 Nov. 1979 Supersedes N80-16164 (18 - 07, p 0837)
(NASA-Case-LAR-12640-1; US-Patent-4,284,461; US-Patent-Appl-SN-092142; US-Patent-Class-156-331.5; US-Patent-Class-156-307.3; US-Patent-Class-156-307.5; US-Patent-Class-156.307.7; US-Patent-Class-528-172; US-Patent-Class-528-173; US-Patent-Class-528-180; US-Patent-Class-528-207; US-Patent-Class-528-208; US-Patent-Class-528-210; US-Patent-Class-528-211; US-Patent-Class-528-225; US-Patent-Class-528-228; US-Patent-Class-528-351; US-Patent-Class-528-353; US-Patent-Class-528-126) Avail: US Patent and Trademark Office CSCL 11A

A meta-oriented aromatic diamine is reacted with an aromatic dianhydride and an aluminum compound in the presence of a water or lower alkanol miscible ether solvent to produce an intermediate polyamic acid. The polyamic acid is then converted to the thermally stable, metal ion-filled polyimide by heating in the temperature range of 300 C to produce a flexible, high temperature adhesive.

Official Gazette of the U.S. Patent and Trademark Office

N82-11207*# IIT Research Inst., Chicago, Ill.
EVALUATION OF THE EFFECTS OF SOLAR RADIATION ON GLASSES Final Report, 9 Jul. 1979 - 31 Dec. 1980
Y. Harada Aug. 1981 61 p refs
(Contract NAS8-33388)
(NASA-CR-161907; IITRI-M06055-10) Avail: NTIS HC A04/MF A01 CSCL 11B

Four optical materials were exposed to simulated solar and particulate radiation in a space environment. Sapphire and fused silica experienced little change in transmittance while optical crown glass and ultra low expansion glass darkened appreciably. A complete analysis of the 500 hour simulated space exposure test was conducted. Additionally, studies were performed to aid in sample selection for a 100 hour simulated exposure test.

J.M.S.

N82-11208*# Polytechnic Inst. of New York, Brooklyn.
THE STABILITY OF NEW TRANSPARENT POLYMERIC MATERIALS: THE EPOXY TRIMETHOXYBOROXINE SYSTEM. PART 1: THE PREPARATION, CHARACTERIZATION AND CURING OF EPOXY RESINS AND THEIR COPOLYMERS Final Report
Eli Pearce and S. C. Lin [1981] 58 p refs
(Grant NsG-2182)
(NASA-CR-164951) Avail: NTIS HC A04/MF A01 CSCL 11G

The effects of resin composition, curing conditions fillers, and flame retardant additives on the flammability of diglycidyl ether of bisphenol-A (DGEBA) as measured by the oxygen index is examined. The oxygen index of DGEBA cured with various curing agents was between 0.198 to 0.238. Fillers and flame retardant additives can increase the oxygen index dependent on the material and the amount used. Changes in the basic cured resin properties can be anticipated with the addition of noncompatible additives. High flame resistant epoxy resins with good stability and mechanical properties are investigated. S.L.

N82-11209*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FRACTURE MECHANICS OF CELLULAR GLASS
J. G. Zwissler and M. A. Adams 1 Feb. 1981 53 p refs
(Contracts NAS7-100; DE-AI01-81ET-20307)
(NASA-CR-164959; JPL-Pub-81-16) Avail: NTIS HC A04/MF A01 CSCL 11A

The fracture mechanics of cellular glasses (for the structural substrate of mirrored glass for solr concentrator reflecting panels) are discussed. Commercial and developmental cellular glasses were tested and analyzed using standard testing techniques and models developed from linear fracture mechanics. Two models describing the fracture behavior of these materials were developed. Slow crack growth behavior in cellular glass was found to be more complex than that encountered in dense glasses or ceramics. The crack velocity was found to be strongly dependent upon water vapor transport to the tip of the moving crack. The existence of a static fatigue limit was not conclusively established, however, it is speculated that slow crack growth behavior in Region 1 may be slower, by orders of magnitude, than that found in dense glasses. B.W.

N82-11210*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CASTABLE HIGH TEMPERATURE FRACTORY MATERIALS Patent Application
Isidor Zaplatynsky, inventor (to NASA) Filed 13 Oct. 1981 5 p
(NASA-Case-LEW-13080-2; US-Patent-Appl-SN-310713) Avail: NTIS HC A02/MF A01 CSCL 11B

The fabrication of chemically inert ceramic bodies that are both high refractory and porous is disclosed. A paste is formed by mixing alumina grain having a uniform particle size with colloidal silica that is stabilized with ammonia. This paste is then cast without forming a compact and dried without pressing. After drying, the cast body was sufficient green strength to be handled, and it is transferred to a furnance for curing. A green body prepared in accordance with the invention does not undergo shrinkage during either curing or prolonged subsequent heating.

NASA

N82-11211*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FABRICATION AND WEAR TEST OF A CONTINUOUS FIBER/PARTICULATE COMPOSITE TOTAL SURFACE HIP REPLACEMENT
Jack C. Roberts (Rensselaer Polytechnic Inst., Troy, N.Y.), Frederick F. Ling (Rensselaer Polytechnic Inst., Troy, N.Y.), and William R. Jones, Jr. 1981 29 p refs Presented at the Joint Lubrication Conf., New Orleans, 5-7 Oct. 1981; cosponsored by ASME and the Am. Soc. of Lubrication Engr.
(Grant DAAG29-79-C-0204)
(NASA-TM-81746; E-709) Avail: NTIS HC A03/MF A01 CSCL 06B

Continuous fiber woven E-glass composite femoral shells having the ame elastic properties as bone were fabricated. The shells were then encrusted with filleld epoxy wear resistant coatings and run dry against ultrahigh molecular weight polyethylene acetabular cups in 42,000 and 250,000 cycle were tests on a total hip simulator. The tribological characteristics of these shells atriculating with the acetabular cups are comparable to a vitallium bal articulating with an ultrahigh molecular weight polyethylene cup. S.L.

N82-11212# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
POLYURETHANE FOAMS FOR AIRCRAFT SHOCK MOUNTS. 3: VIBRATION DAMPING BY POLYETHER

FOAMS Progress Report, Sep. 1979 - Jun. 1980
James V. Duffy Jul. 1981 38 p refs
(AD-A104496; NSWC/TR-80-343) Avail: NTIS HC A03/MF A01 CSCL 11/9

The objective of this program was to develop flexible foam systems which would meet the specifications outlined in MIL-F-81334B(AS). The vibration damping and mechanical properties of a series of foams based on mixtures of poly (oxytetramethylene) glycol and poly(oxypropylene) polyol were determined. The effect of polyol ratio, foam density, surfactant type and unit loading on vibration output transmissibility for these systems is reported. Author (GRA)

N82-11213# Army Materials and Mechanics Research Center, Watertown, Mass. Polymer Research Div.
MECHANISM OF MONURON-ACCELERATED DICYANDIAMIDE CURE OF EPOXY RESINS Final Report
Bernard R. LaLiberte and Joseph Bornstein Jul. 1981 13 p refs
(DA Proj. 1L1-62105-AH-84)
(AD-A104658; AMMRC-TR-81-34) Avail: NTIS HC A02/MF A01 CSCL 11/9

A very interesting and practical property of trisubstituted ureas such as Monuron, is the ability of this class of aryl ureas to accelerate the dicyandiamide (Dicy) cure of epoxy resins. Earlier workers had proposed that the in situ formation of dimethylamine from Monuron was an important factor in explaining the mechanism of the Monuron-accelerated dicyandiamide cure of epoxy resins. The main source of dimethylamine did not appear to us to be that which had been previously described. We have found that the amine is generated by a cyclocondensation reaction between the aryl urea and the resin to form a 2-oxazolidone. During this study, it was found that the effectiveness with which dimethylamine activates Dicy, especially when compared to other materials such as trimethylamine, made this amine unique. It is postulated that dimethylamine has a strong proclivity to remove a proton from Dicy, thereby creating a highly active nucleophilic species. This enhancement of the nucleophilic nature of the hardening agent (DICY) would account for the increased reactivity of Dicy toward epoxy resins. Author (GRA)

N82-11214# National Bureau of Standards, Washington, D.C. Metallurgy Div.
APPLICATION OF SOLIDIFICATION THEORY TO RAPID SOLIDIFICATION PROCESSING Semiannual Technical Report, 1 Oct. 1980 - 31 Mar. 1981
W. J. Boettinger, J. W. Cahn, S. R. Goriell, J. R. Manning, and R. J. Schaefer Jun. 1981 65 p refs
(ARPA Order 3751)
(AD-A104561) Avail: NTIS HC A04/MF A01 CSCL 11/2

The objective of this work is to develop guidelines based on kinetic and thermodynamic solidification theory for prediction and control of rapid solidification processes. In particular, segregation effects and rules governing the formation of equilibrium and non-equilibrium phases, including metallic glasses, will be investigated. Areas where significant improvements in alloy properties can be produced by rapid solidification will be emphasized. Author (GRA)

N82-11215# McDonnell Aircraft Co., St. Louis, Mo. Material and Process Development Dept.
CHEMORHEOLOGY AND QUALITY CONTROL FOR AN ADHESIVE Final Report, 15 Jul. 1980 - 15 Jul. 1981
J. F. Carpenter Jul. 1981 34 p ref
(Contract N00019-80-C-0319)
(AD-A104556) Avail: NTIS HC A03/MF A01 CSCL 11/1

The objective of this program has been to develop rheological test methods applicable to an adhesive system and demonstrate the viability of these techniques for in-plant quality control and to establish acceptance criteria with statistically valid accept/reject limits. Author (GRA)

N82-11216# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
MICROSTRUCTURE OF AMORPHOUS AND SEMI-CRYSTALLINE POLYMERS Final Report, Feb. 1977 - Oct. 1980
Donald R. Uhlmann 7 Jun. 1981 86 p refs
(Grant AF-AFOSR-3226-77; AF Proj. 2303)
(AD-A102853; AFOSR-81-0629TR) Avail: NTIS HC A05/MF A01 CSCL 11/9

Work which was carried out under this grant has led to the development of a technique for scanning transmission electron microscope of polymers which seems to offer outstanding promise for the characterization of their structures. When applied to amorphous thermoplastics, the structures are found to be homogeneous down to the limit of resolution to the microscope, with no evidence found for the presence of nodular features or other structures characteristic of regions of local order in the materials. This finding is in accord with the results of small angle neutron scattering studies of same materials. Based on the combined results of these studies, it is suggested that the nodular hypothesis be laid to rest and that the structure of flexible chain amorphous polymers be represented by models such as the random coil. The technique of microtoming bulk samples followed by staining with heavy metal atoms and viewing with Z contrast in the scanning transmission electron microscope has also been used with success to characterize the structures of epoxy and polyimide resins. Commercial polyimide films have been shown to be homogeneous on a scale of 50-200 Angstroms with the scale and form of the heterogeneities varying through the thickness of the film. The structure of epoxy resins presents a more complicated issue. GRA

N82-11217# Westinghouse Research and Development Center, Pittsburgh, Pa.
DESIGN OF REFRACTORIES FOR RESISTANCE TO HIGH-TEMPERATURE EROSION-CORROSION Final Report
C. A. Andersson, A. Y. Ranadive, and T. Vojnovich Jul. 1981 149 p refs Sponsored in part by EPRI
(EPRI Proj. 625-2)
(DE81-904208; EPRI-AP-1955) Avail: NTIS HC A07/MF A01

A theory describing erosion of refractory walls in pneumatic flow was developed. Measurements of particle/wall collisions, wall erosion rates and particle attrition in pneumatic transport of solids were taken. A model was formulated that relates the kinetic energies of striking particles to the fracture energies of wall materials using three failure criteria. Test measurements of the erosion rates of eight refractories with various eroding particle materials, at room temperature and at high temperatures were performed. Results of the erosion tests provided the unknown coefficients in the erosion model and identified the mode of particle attrition in pneumatic flow. DOE

N82-11218# Mound Lab., Miamisburg, Ohio.
MANGANESE GLASS-MOLYBDENUM METALLIZED AND COPPER BRAZED 99.5% ALUMINA CERAMICS M.S. Thesis
K. White (Dayton Univ.) 22 Jul. 1981 80 p refs
(Contract DE-AC04-76DP-00053)
(DE81-030423; MLM-2850) Avail: NTIS HC A05/MF A01

The seal strength of manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics was studied as a function of the glass composition, the molybdenum content of the metallizing paint, and the metallizing temperature. Interactions of individual paint constituents with 99.5% alumina ceramic were also examined and related to the sealing mechanism. The paints made of glasses with high MnO content were found to produce excellent bonding strength at a approx. 13000 C metallizing temperature. The paints containing 70 vol % molybdenum exhibited the most consistent and the highest seal strengths. DOE

N82-11219# California Univ., Livermore. Lawrence Livermore Lab.
ELASTOMER UNISTRUCTURE INSULATORS
L. P. Bradley, E. L. Orham, and R. L. Anderson (American Controls, Inc., San Diego, Calif.) 1 Jun. 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-48)
(DE81-024366; UCRL-85721; CONF-810659-26) Avail: NTIS HC A02/MF A01

A single elastomer high voltage dielectric insulator which provides low inductance interconnection of capacitors, railgaps,

and vacuum load was developed. It complies against conductors to prevent tracking. Results indicate that operation below a threshold breakdown field provides long lifetime. DOE

N82-11220# California Univ., Livermore. Lawrence Livermore Lab.
MICROSTRUCTURE OF EXPLOSIVELY COMPACTED ALUMINUM NITRIDE CERAMIC
W. H. Gourdin, C. J. Echer, C. F. Cline, and L. E. Tanner (California Univ., Berkeley. Lawrence Berkeley Lab.) 1 May 1981 12 p refs Presented at the 7th Intern. Conf. on High Energy Fabric., Leeds, England, 15 Sep. 1981
(Contract W-7405-eng-48)
(UCRL-85274; CONF-810910-1) Avail: NTIS HC A02/MF A01

Observations are reported of the microstructure of aluminum nitride (AIN) ceramic produced by explosive consolidation of the powder. Similarities between the grain structure of the compact and the starting powders are striking. Grain growth does not occur during densification and the 0.1 mu particle size of the powder is retained, although considerable deformation is introduced into individual grains. Of particular interest is an intergranular phase which appears throughout the compact. Observations in the transmission electron microscope indicate that this phase is amorphous. The influence of this glassy intergranular phase on bonding is discussed. DOE

N82-11221# Sandia Labs., Albuquerque, N. Mex.
TRAP ACTIVATION MODEL FOR HYDROGEN RETENTION AND ISOTOPE EXCHANGE IN SOME REFRACTORY MATERIALS
D. K. Brice and B. L. Doyle 1981 5 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025995; SAND-81-0295C; CONF-810831-2) Avail: NTIS HC A02/MF A01

Our recently developed Local Mixing Model (LMM) has been successful in describing and predicting the properties of hydrogen retention and isotope exchange for a variety of refractory materials. For some materials, however, the detailed predictions of the LMM are not observed. A Trap Activation Model (TAM) is proposed here to account for the observed departures from the LMM. DOE

N82-11222# Pennsylvania State Univ., University Park. Materials Research Lab.
INNOVATIVE TECHNOLOGY FOR FABRICATION OF CERAMICS: EDS RAPID SOLIDIFICATION PROCESS APPLICATION TO SPECIALIZED MATERIALS Final Report, 30 Jun. 1975 - 30 Sep. 1980
Della M. Roy, Rustum Roy, and T. P. Holleran 15 Nov. 1980 53 p refs
(Grant DI-BM-GO-155191)
(PB81-214868; BM-OFR-66-81) Avail: NTIS HC A04/MF A01 CSCL 11B

A rapid solidification technology method to produce fine ceramic powders of many compositions with unique properties is examined. The process uses salt solutions and includes two steps, the first to evaporate the liquid and the second to very rapidly decompose the salt to a very fine powder. The process was demonstrated in terms of the following material applications: aluminates, ferrites, phosphors, ionic conductors, and cements. This technique of producing ceramic powders offers a number of potential advantages over existing methods such as ability to produce complex compositions, lower energy requirements, and improved properties. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-11223*# National Aeronautics and Space Administration, Washington, D. C.
TECHNICAL AND ECONOMIC ASPECTS OF HYDROGEN STORAGE IN METAL HYDRIDES
R. Schmitt Sep. 1981 44 p refs Transl. into ENGLISH from Proc. of the Intern. Workshop on Hydrogen and its Perspectives, v. 1, Liege, 1976 p 1-48 Presented at the Intern. Workshop on Hydrogen and its Perspectives, Liege, 15-18 Nov. 1976 Original language document was announced as A78-18842 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Battelle Memorial Inst., Geneva
(Contract NASw-3198)
(NASA-TM-76610) Avail: NTIS HC A03/MF A01 CSCL 21D

The recovery of hydrogen from such metal hydrides as LiH, MgH2, TiH2, CaH2 and FeTiH compounds is studied, with the aim of evaluating the viability of the technique for the storage of hydrogen fuel. The pressure-temperature dependence of the reactions, enthalpies of formation, the kinetics of the hydrogen absorption and desorption, and the mechanical and chemical stability of the metal hydrides are taken into account in the evaluation. Economic aspects are considered. Development of portable metal hydride hydrogen storage reservoirs is also mentioned. Author

N82-11224*# Lockheed-California Co., Burbank.
EXPERIMENTAL STUDY OF FUEL HEATING AT LOW TEMPERATURES IN A WING TANK MODEL, VOLUME 1 Final Report
Francis J. Stockemer Aug. 1981 75 p refs
(Contract NAS3-21977)
(NASA-CR-165391; LR-29935-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 21D

Scale model fuel heating systems for use with aviation hydrocarbon fuel at low temperatures were investigated. The effectiveness of the heating systems in providing flowability and pumpability at extreme low temperature when some freezing of the fuel would otherwise occur is evaluated. The test tank simulated a section of an outer wing tank, and was chilled on the upper and lower surfaces. Turbine engine lubricating oil was heated, and recirculating fuel transferred the heat. Fuels included: a commercial Jet A; an intermediate freeze point distillate; a higher freeze point distillate blended according to Experimental Referee Broadened Specification guidelines; and a higher freeze point paraffinic distillate used in a preceding investigation. Each fuel was chilled to selected temperature to evaluate unpumpable solid formation (holdup). Tests simulating extreme cold weather flight, without heating, provided baseline fuel holdup data. Heating and recirculating fuel increased bulk temperature significantly; it had a relativley small effect on temperature near the bottom of the tank. Methods which increased penetration of heated fuel into the lower boundary layer improved the capability for reducing holdup. S.L.

N82-11225*# National Aeronautics and Space Administration, Washington, D. C.
THE STORAGE OF HYDROGEN IN THE FORM OF METAL HYDRIDES: AN APPLICATION TO THERMAL ENGINES
C. Gales (Comm. a l'Energie Atomique, Centre d'Etudes Nucl. de Grenoble) and P. Perroud (Comm. a l'Energie Atomique, Centre d'Etudes Nucl. de Grenoble) Aug. 1981 39 p refs Transl. into ENGLISH from Proceedings of the Assoc. des Ingr. Electriciens sortis de L'Inst. Electrotech. Montefiore, Belgium, v. 1, 1977 p 1-34 Conf. held at Liege, Belgium, 15-18 Nov. 1976 Original language document was announced as A78-18845 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76609) Avail: NTIS HC A03/MF A01 CSCL 21D

The possibility of using LaNi56, FeTiH2, or MgH2 as metal hydride storage sytems for hydrogen fueled automobile engines is discussed. Magnesium copper and magnesium nickel hydrides studies indicate that they provide more stable storage systems than pure magnesium hydrides. Several test engines employing hydrogen fuel have been developed: a single cylinder motor originally designed for use with air gasoline mixture; a four-cylinder

engine modified to run on an air hydrogen mixture: and a gas turbine. S.L.

N82-11226# Ballistic Research Labs., Aberdeen Proving Ground, Md. Ballistic Research Lab.

DEVELOPMENT OF INVERSE RAMAN SPECTROSCOPY FOR PROBING RAPIDLY DECOMPOSING EXPLOSIVES AND PROPELLANTS

David R. Crosley and Michael A. Schroeder Jul. 1981 78 p refs

(DA Proj. 1L1-61102-AH-43)

(AD-A104382; AD-E430677; ARBRL-TR-02345) Avail: NTIS HC A05/MF A01 CSCL 07/4

The techniques of inverse Raman spectroscopy and coherent anti-stokes Raman spectroscopy are considered for the purpose of development of rapid (single-shot) broad band detection of species in rapidly (explosively) decomposing materials. Experiments using inverse Raman spectroscopy with pulsed ruby laser, broad-band dye, 1-M spectrometer and optical multichannel analyzer are described. Results on benzaldehyde (neat and in mixtures with toluene) yield information on the quantitative limits of inverse Raman detection. GRA

N82-11227# Army Armament Research and Development Command, Dover, N. J. Energetic Materials Div.

THE EFFECTS OF GASEOUS ATMOSPHERES ON THE PERFORMANCE CHARACTERISTICS OF ALUMINUM-SODIUM NITRATE FLARES

Patricia L. Farnell, Francis R. Taylor, and Anthony J. Beardell Aug. 1981 31 p refs

(AD-A104383; AD-E400687; ARLCD-TR-81026) Avail: NTIS HC A03/MF A01 CSCL 19/1

The burning rates and the light outputs produced by burning binary mixtures of aluminum and sodium nitrate have been studied as a function of composition and of atmospheric content. Also studied were the effects of loading pressure upon the combustion process. The gaseous atmospheres investigated were mixtures of oxygen and nitrogen, argon, or helium. For all systems except those in which the composition was pressed at high loading pressure, the burning rate was unaffected as oxygen concentration was changed, indicating that heat and radiation feedback from the flame have only a minor influence on the burning rate. Consequently, it is hypothesized that the burning rate is essentially controlled by the exothermic processes occurring at or very near to the burning surface. For all systems, the burning composition produced low light output when oxygen was excluded from the atmosphere. With increasing oxygen content, the light output increased by a large factor. This indicates that at low oxygen concentrations much of the metal escaped from the flame unburned. For compositions with low metal content, propagation is very difficult. It is believed that the decomposition of excess sodium nitrate removes heat from the burning surface. This heat loss reduces the rate of vaporization of the metal, causing this vaporization to become the rate controlling step. At the point at which the vaporization rate becomes considerably lower than the rate of oxidation of the metal, the flame will be quenched due to lack of fuel. GRA

N82-11228# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels and Lubrication Div.

JET FUEL LOCKS TO SHALE OIL: THE 1980 TECHNOLOGY REVIEW

Herbert R. Lander May 1981 156 p refs Proceedings of Conf. held at Cincinnatti, 19-20 Nov. 1980

(AF Proj. 2480)

(AD-A104414; AFWAL-TR-81-2063) Avail: NTIS HC A08/MF A01 CSCL 11/4

The progress of several Air Force shale oil related programs is reported. Three shale oil processing studies evaluating the yield, cost, and quality of JP-4 and JP-8 turbine fuel produced from whole crude shale oil are discussed. Details of a fourth program that produced 11,300 gallons of specification JP-4 from Geokinetics shale oil are reported. Some of this jet fuel was tested in Air Force Fuel Mainburner/Turbine Effects Programs and was shown to behave very similar to petroleum derived JP-4. An additional study concentrated on developing hydrotreating catalysts that would more efficiently convert shale oil into aviation turbine fuel. Author (GRA)

N82-11229# School of Aerospace Medicine, Brooks AFB, Tex. Crew Technology Div.

OPTOACOUSTIC SPECTROSCOPY TO DETECT HYDRAZINE FUELS Final Report, 1 May 1979 - 1 Feb. 1980

Edward S. Kolesar, Jr. Jul. 1981 74 p refs

(AF Proj. 7930)

(AD-A104675; SAM-TR-81-15) Avail: NTIS HC A04/MF A01 CSCL 14/2

This analysis has presented the basic theory of optoacoustic spectroscopy oriented toward designing a specific system to measure the hydrazine fuels. The fundamental goal in designing this system has been to measure absorption with the greatest possible sensitivity and, thus, maximize the signal-to-noise ratio. In this analysis, all vital components have been selected from commercially available sources and integrated into a system design. A word of caution is due, however, because only the fundamental sources of noise have been considered. In any real system, additional noise sources may further degrade performance. Some commonly encountered problems are extraneous acoustic noise, vibration-induced noise, and unwanted signals generated by absorption of laser beam energy, by sample cell walls and windows. To fine-tune a specific system, each of these practical problems would have to be resolved. For such purposes, experimentation has yielded the best results in the past, and would be expected to do so in the future. Author (GRA)

N82-11230*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.

AN ASSESSMENT OF THE USE OF ANTIMISTING FUEL IN TURBOFAN ENGINES Final Report, Sep. 1979 - Nov. 1980

A. Fiorentino, R. DeSaro, and T. Franz Jun. 1981 53 p refs (Contract NAS3-22045)

(NASA-CR-165258; AD-A104673; PWA-5697-29; FAA-CT-81-58) Avail: NTIS HC A04/MF A01 CSCL 21/4

An evaluation was made on the effects of using antimisting kerosene (AMK) on the performane of the components from the fuel system and the combustor of a current in-service JT8D aircraft engine. The objectives were to identify problems associated with using antimisting kerosene and to determine the extent of shearing or degradation required to allow the engine components to achieve satisfactory operation. The program consisted of a literature survey and a test program which evaluated the antimisting kerosene fuel in laboratory and bench component testing, and assessed the performance of the combustor in a high pressure facility and in an atitude relight/cold ignition facility. Performance of the fuel pump and control system was evaluated in an open loop simulation. Thus far, results of the program would not preclude the use of antimisting kerosene in a jet engine application. GRA

N82-11231# Naval Ship Research and Development Center, Annapolis, Md. Ship Materials Engineering Dept.

OUTGASSING OF TWO SYNTHETIC FUELS Final Report

Peter Demas Sep. 1981 25 p refs

(ZF43451001)

(AD-A104580; DTNSRDC/SME-80/46) Avail: NTIS HC A02/MF A01 CSCL 21/4

The outgassing characteristics of two synthetic fuels proposed for Navy use were investigated to determine whether potentially toxic gases could be released into ships' atmospheres. The synthetic fuels studied were: (1) shale diesel fuel W-375 prepared to conform to MIL-F-16884G and (2) shale jet fuel W-383 prepared to conform to MIL-T-5624K. These outgassing characteristics of the synthetic fuels were compared to the outgassing characteristics of a conventional petroleum fuel conforming to MIL-16884G obtained from USS PONCE (LPD 15). Single samples of each fuel were sequentially exposed to temperatures of 50, 150, and 250 C for 3 hours at each temperature, and the types and amounts of the outgassed products were determined. Carbon monoxide, hydrocarbons, aldehydes, nitrogen oxides, and sulfur dioxide were outgassed. Of these, only the amount of carbon monoxide produced by diesel fuel W-375 and the amount of aldehydes produced by the conventional diesel fuel were relatively significant since each exceeded the Threshold Limit Value for these constituents by a factor of about 13. Some decomposition was evidenced when fuel W-375 was heated up to 245 C. It is recommended that similar studies be

performed with more types of synthetic fuels as these develop and become available in order to establish a better comparison of outgassing between these fuels and the conventional fuels.
Author (GRA)

N82-11232# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
AN INVESTIGATION OF THE COMBUSTION PROCESS IN SOLID FUEL RAMJETS M.S. Thesis
William Vernon Goodwin Jun. 1981 58 p refs
(AD-A104603) Avail: NTIS HC A04/MF A01 CSCL 21/4

An experimental investigation was conducted into four areas of the solid fuel ramjet ,combustion process: (1) the effects of near-wall turbulent mixing and equivalence ratio on combustion efficiency, (2) the effects of bypass air on combustion efficiency, (3) the combustion process in a cylindrically perforated fuel grain with a twin side-dump/dome configuration, and (4) the comparison of experimental radial temperature profiles to computer generated radial profiles. Polymethylmethacrylate fuel grains were burned in a ramjet motor and a thrust stand. Combustion efficiencies were determined and compared for different configurations. It was found to be insensitive to variations in the mixture ratio and to near-wall mixing. Bypass air was found to adversely affect the combustion efficiency both in stable and unstable combustion environments. The twin side-dump/dome configuration was unable to sustain combustion for all conditions investigated. Theoretical radial temperature profiles were found to have larger near wall gradients than were measured experimentally.
Author (GRA)

N82-11233# Bechtel Corp., San Francisco, Calif.
ALTERNATIVE FUEL FOR THE STEEL INDUSTRY OF NORTHERN INDIANA: A PREFEASIBILITY STUDY OF A CENTRAL COAL GASIFICATION PROJECT
May 1981 275 p refs Sponsored in part by Northern Indiana Public Service Co.
(Contract DE-FG01-80RA-50146)
(DE81-029314; DOE/RA-50146/1) Avail: NTIS HC A12/MF A01

A survey of the demand for natural gas indicates a wide variation, from a low of 220 billion Btu per day to a high of 387 billion Btu per day. After an examination of the market demand, it was concluded that the synthetic fuels plant should be sized to produce 120 billion Btu per day of gas. Due to the costs of installing additional gas distribution systems and modifying fuel burning equipment, it was concluded that a medium Btu gas should be produced that would have special properties to meet the requirements of existing equipment. The Lurgi and Texaco gasification processes were chosen as the basis for the study. The most significant environmental constraint will be air quality. Although the use of either process is feasible, NIPSCO selected the Texaco case for the development of the economics. A cash flow analysis indicates that the price of medium Btu gas required to yield a 15 percent DCF return on equity is $5.67 per million Btu in 1981 dollars. This is approximately equal to the current price of imported oil. It is based on a 20 year financial analysis using a 3:1 debt to equity ratio and assumes an annual escalation in cost and gas price of 10 percent. DOE

N82-11234# Gabrielson (James E.), Plymouth, Minn.
CATTAIL RHIZOME-DERIVED ALCOHOL Interim Report
J. E. Gabrielson 30 May 1981 22 p refs
(Contract DE-FG02-81AF-92016)
(DE81-028307; DOE/AF-92016/T1) Avail: NTIS HC A02/MF A01

Over 600 pounds of chizomes, weighted wet and dirty were harvested and air dried. Average yields, on low land, were 1.9 tons/acre. Yields from areas in ponds may have been higher but it is difficult to estimate the areas. Sixteen fermentations were made. The results show that the chizomes do not ferment well unless they are finely ground, and saccharified with acid, malt, or enzymes. Grinding and screening so the feed passes a 40 mash screen and then saccharifying with two enzymes produced the best results. Over 50% of the solids were converted to alcohol and carbon dioxide, 25% yield of alcohol based on dry weight of solids. Based on the maximum land harvest rate and the best alcohol yield production of 285 gallons of alcohol/acre of cattails are projected. DOE

N82-11235# Agri Stills of America, Springfield, Ill.
DEVELOPMENT OF A SMALL-SCALE COMMERCIAL ALCOHOL DEHYDRATION 190 TO 200 PROOF Final Report
1981 5 p refs
(Contract DE-FG02-81AF-92005)
(DE81-030158; DOE/AF-92005/T1) Avail: NTIS HC A02/MF A01

A small scale farm sized commercial unit to produce anhydrous 200 proof ethanol from 190 proof source of locally produced grain alcohol (ETOH) was investigated. The approach is to investigate a low pressure process to efficiently separate water from 190 proof alcohol, with and without the use of a third component to break the azeotrope of water and alcohol formed during atmospheric conditions. Results from this experiment show that a vacuum shell is not sufficient in design to effect wet alcohol to the anhydrous state. DOE

N82-11236# Cincinnati Univ., Ohio. Dept. of Chemistry.
COAL HYDROGENATION VIA BONDING OF METALLIC COMPOUNDS TO COAL, PART 1. SOLUBILIZATION OF ILLINOIS BITUMINOUS COAL - THE CRITICAL IMPORTANCE OF METHYLENE GROUP CLEAVAGE, PART 2 Final Report
Milton Orchin 1981 23 p refs
(Contracts DE-AS01-76ET-10517; EF-76-01-2308-10)
(DE81-027562; DOE/ET-10517/T1) Avail: NTIS HC A02/MF A01

Data for the hydrogenation of Elkhorn coal at 390 C with the initial pressure of 13.8 MPa hydrogen and with various catalysts (stannous chloride and complexes of cobalt and tin), and solvents (decalin and tetralin) are presented in tabular form and results are discussed. Model compounds of coal, polystyrene beads were tin-bonded and tin-impregnated, then hydrogenated under various temperatures, pressures, and with either decalin or tetralin. Results show both hydrogen and the tin catalyst are necessary for liquefaction at 390 C, and under comparable conditions, bonded tin gave greater liquefaction than impregnated tin but with considerably greater hydrogen consumption. In the coal solubilization study, solubilization by hydroliquefaction and by chemical reduction with potassium in tetrahydrofuran seems to indicate that initial degradation of coal by both techniques proceeds by ether cleavage and that further degradation is achieved in both cases by methylene bridge attack. The nuclear magnetic resonance studies on hydroliquefaction products indicate that Illinois bituminous coal is structurally quiet homogeneous.
DOE

N82-11237# Northern Resources, Inc., Billings, Mont.
FEASIBILITY AND ECONOMIC STUDY OF MEDIUM-BTU COAL GAS BLENDED WITH HIGH-BTU BY PRODUCT GAS AS AN INDUSTRIAL ENERGY SOURCE AT BILLINGS, MONTANA
May 1981 23 p
(Contract DE-FG01-79RA-20219)
(DE81-025166; DOE/FE-20219/1) Avail: NTIS HC A02/MF A01

The technical and economic feasibility of blending a medium Btu gas (CMG) produced from coal by the Winkler fluidized bed gasification process with excess refinery fuel gas to be used as an industrial fuel in Billings, Montana is assessed. The background of the project; the site selection process, the conceptual design of the process and supporting facilities, the retrofit requirements and other costs associated with burning the MBG, the environmental and permitting aspects of the project, the cost estimates and economic considerations, the contract provisions for MBG buy/sell agreements, the government's role in supporting the project and the market potential for the project in Billings and similar projects in other markets are discussed. It is concluded that the project is technically feasible and economically viable today although parity with conventional fuels will not occur until 1985. DOE

N82-11238# AmeriGas, Inc., Valley Forge, Pa.
CONCEPTUAL DESIGN FOR A MULTI-USER MEDIUM BTU COAL GASIFICATION COMPLEX. VOLUME 1: EXECUTIVE SUMMARY
Sep. 1980 106 p

(Contract DE-FG01-80RA-50135)
(DE81-027139; DOE/FE-50135/2) Avail: NTIS HC A06/MF A01

On the basis of fuel requirements, a gasifier to produce immediate Btu gas (250 Btu/SCF) at a scale of 8.3 million Btu/day was designed. The basic conclusion, based upon the $6.45/MM Btu required selling price of IFG for this project, was that the facility, as designed, does not present a viable business opportunity. Still existing are the customer's need for long term, stable supplies of clean energy with high fuel utilization load factors. The failure to produce a viable business opportunity does not condemn the process or the project. Even at $6.45/MM Btu, the economic attractiveness of the project was not so poor as originally perceived. When the recent volatile energy price variations are coupled with current rates of inflation and proposed deregulation of natural gas, the long-term attractiveness of IFG is visible. The hurdle here is convincing management that the risks of accepting a higher, yet secure cost of energy now is more than off-set by future savings. Various financial incentives are considered. DOE

N82-11239# TRW, Inc., Redondo Beach, Calif.
LABORATORY STUDY FOR REMOVAL OF ORGANIC SULFUR FROM COAL Final Report
1 Jul. 1981 210 p refs
(Contract DE-AC22-80PC-30141)
(DE81-025132; DOE/PC-30141/T4) Avail: NTIS HC A10/MF A01

A description of laboratory experimental equipment and a detailed discussion of the results is presented. Initial and concluding engineering design and cost estimations are also presented and the last two sections contain recommendations for future work and an appendix of laboratory data. The TRW Gravimelt Process involves the treatment of mine-cleaned coal with molten potassium and or sodium hydroxide to chemically extract both organic and pyritic sulfur into the molten alkali. The coal mineral content is broken down to forms insoluble in water but soluble in a second liquid, usually dilute sulfuric acid. The high density of the melt causes the desulfurized coal to float to the surface, where it is skimmed off. The coal is then washed with water to completely recover the alkali metal and the coal is dried. If the coal is next washed with a second liquid, almost all of the mineral matter is extracted into the solution. DOE

N82-11240# New York State Energy Research and Development Authority, New York.
LOW/MEDIUM-BTU COAL-GASIFICATION ASSESSMENT PROGRAM FOR SPECIFIC SITES OF TWO NEW YORK UTILITIES
Dec. 1980 377 p
(Contract DE-FG01-79RA-20223)
(DE81-025518; DOE/RA-20223/T1) Avail: NTIS HC A17/MF A01

The technical and economic aspects of coal gasification to supply low or medium Btu gas to two power plant boilers are investigated. Coals from different regions of the country were investigated in terms of their availability, mode of transportation and delivered cost to each power plant site. The effects of burning low and medium Btu gas in the selected power plant boilers on efficiency, rating and cost of modifications are also examined. Both plants meet the federal, state and local environmental requirements for air quality, wastewater liquid disposal, and ground level disposal of byproduct solids of the synthetic gas alternative result in bus bar cost savings on a yearly basis within a few years of start up because the cost of gas is assumed to escalate at a lower rate than that of fuel oil, approximately 4 to 5%. DOE

N82-11241# Sandia Labs., Albuquerque, N. Mex. Explosive Materials Div.
DEFLAGRATION-TO-DETONATION TRANSITION (DDT) PROJECT Semiannual Report, Jun. - Nov. 1980
W. George Perkins, ed. Jul. 1981 40 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030979; SAND-81-0937) Avail: NTIS HC A03/MF A01

A generalized computer model of the deflagration detonation transition was written and methods were developed for analyzing impurities in cobalt perchlorate (CP). A data base was established for the corrosion, compatibility, and reliability of CP-loaded detonators. Components for small, safe detonators were evaluated. DOE

N82-11242# Gulf Science and Technology Co., Pittsburgh, Pa. Chemical and Minerals Div.
EFFECTS OF COMPONENTS OF SYNFUELS ON SOOT FORMATION Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981
J. E. Haebig and P. M. Goldberg Aug. 1981 16 p refs
(Contract DE-AC22-80PC-30307)
(DE81-027961; DOE/PC-30307/3; Gulf-627RM073; QTPR-3) Avail: NTIS HC A02/MF A01

The development of an experimental system for the study of the relationships between the rate and amount of soot formation in the combustion of coal derived synfuels and the chemical composition and molecular constituents of those fuels was completed. A burner and pressure vessel were fabricated and assembled along with a flow control panel for seven gas streams. The optical components for laser light scattering were used. Future experimental features were identified. Data on coal liquid properties and composition are discussed. DOE

N82-11243# Minnesota Gas Co., Minneapolis.
PEAT BIOGASIFICATION DEVELOPMENT PROGRAM
Cambridge, Mass. Dynatech R/D Co. 21 Apr. 1981 240 p refs
(Contract DE-AC01-79ET-14696; Dynatech Proj. MGC-2)
(DE81-028299; DOE/ET-14696/T6; Dynatech-2115) Avail: NTIS HC A11/MF A01

The advantage of the biogasification method is it can use the peat in a high moisture state, thereby eliminating the need to provide energy for drying peat. A preliminary investigation (Appendix B) of the peat biogasification process (funded by Minnesota Gas Company) Showed potential technical and economic feasibility of the process, sufficient to carry out the present program. Based on the results of the present program the solubilization, oxidation, and digestion steps have been defined sufficiently to lead to a more reliable process design and preliminary estimate of the fuel gas production costs. This present program was initiated to develop an experimental data base for the solubilization, oxidation, and fermentation reactions, and to use this data base to develop a conceptual preliminary process design and thus enable a preliminary estimation of the economics (capital and operating costs and unit gas costs) for process.DOE

N82-11244# Argonne National Lab., Ill. Energy and Environmental Systems Div.
ADVANCED SYSTEM EXPERIMENTAL FACILITY: SOLID WASTE TO METHANE GAS. BACKGROUND AND PROCESS DESCRIPTION
R. Isaacson and J. Pfeiffer Mar. 1981 15 p refs
(Contract W-31-109-eng-38)
(DE81-030198; ANL/CNSV-22) Avail: NTIS HC A02/MF A01

The Refuse Conversion to Methane Facility in Pompano Beach, Florida, a 100-ton/day experimental plant to convert municipal solid waste (MSW) to methane for fuel was designed to assess the technical merit of anaerobic digestion of the MSW process. Approximately 40 ton/day of volatile solids are fed to the digesters; of this, about 25 ton/day will be converted to gases. For each pound of volatile solids destroyed, 6.6 std. cu ft of methane gas and 6.6 std. cu ft of CO2 will be produced. Thus, the plant will yield approximately 330,000 std. cu ft/day each of methane and CO2. The most important process variables are to be tested allowing judgments to be made on scale up considerations. DOE

N82-11245# Aerospace Corp., Los Angeles, Calif.
NEAR-TERM GOALS FOR ALCOHOL FUELS FROM BIOMASS: AN OVERVIEW OF RESOURCE REQUIREMENTS, LAND USE, ENVIRONMENTAL, AND SOCIOECONOMIC IMPACTS
J. Halsey, D. Hazard, K. Kawaoka, K. Stephens, and G. DAlessio (DOE) Argonne, Ill. Argonne Natl. Lab. Dec. 1980 111 p refs

(Contract W-31-109-eng-38)
(DE81-029987; ANL/EES-TM-149) Avail: NTIS HC A06/MF A01

The biomass resources needed to meet national alcohol production goals are examined, available technologies for utilizing agricultural products and byproducts are reviewed, and potential environmental and socioeconomic impacts of near-term alcohol production are identified. Near-term (1985 to 1986) land resource requirements and impacts are emphasized with particular attention to the major corn producing states. Results indicate that: (1) the grain availability for ethanol production does not appear to be limiting for these near-term production capacity goals; (2) major expansion of acreage planted in corn should not result from these goals; (3) environmental impacts on and from farm lands should not increase significantly; (4) food prices may increase due to the near-term goals, but farmers should benefit overall; and (5) the expansion of alcohol production in the longer term (1986 to 2000 and beyond) will necessitate the use of additional biomass feedstocks and residues. DOE

N82-11246# Battelle Pacific Northwest Labs., Richland, Wash.
PRODUCTION AND UTILIZATION OF METHANE FROM ANAEROBIC SLUDGE DIGESTION IN U.S. WASTEWATER-TREATMENT PLANTS
Jul. 1981 109 p refs
(Contract DE-AC01-76CS-20300)
(DE81-029958; DOE/CS-20300/3) Avail: NTIS HC A06/MF A01

Three generic onsite uses were selected for energy and cost accounting analysis: heat generation, mechanical energy generation, and electrical energy generation. Of the gas utilization methods analyzed, the most energy efficient and cost effective was found to be the direct production of mechanical energy to drive aerators and pumps. Between 50 and 80 percent of the mechanical energy required for wastewater treatment can be provided by digester gas. In addition, waste heat can be recovered from the engines to aid in heating the digesters and buildings. Total energy costs for the mechanical energy generation scheme averaged around $30/million gallons treated, compared to $34/million gallons and $45/million gallons for the electrical energy generation and heat generation schemes, respectively. DOE

N82-11247# California Univ., Livermore. Lawrence Livermore Lab.
SOLAR COAL-GASIFICATION REACTOR FOR HYDROCARBON-FREE SYNTHESIS GAS
W. R. Aiman Jun. 1981 10 p Presented at the STTF Users Assoc. Ann. Meeting, Pasadena, Calif., 23 Apr. 1981
(Contract W-7405-eng-48)
(DE81-026600; UCRL-86260; CONF-810469-3) Avail: NTIS HC A02/MF A01

The products from a coal gasification process are discussed. In synthesis gas production, the end product is a high Btu gas composed of methane and higher hydrocarbons. Furthermore, the liquid hydrocarbons can be even more valuable as feedstocks for other processes. In other applications such as methanol production, the hydrocarbon content of the synthesis gas is a non-reactive diluent that must be bled away from the product synthesis area to keep its concentration from building up. In addition to the above benefits, this reactor requires substantially less steam in the coal gasification process. The reactor is able to produce hydrocarbon-free synthesis gas because it withdraws the pyrolysis gases from the reactor as they are formed and reinjects them above the char gasification zone where they are steam reformed into CO, CO2, and H2. Since almost all of the hydrocarbons released in coal gasification come off with the pyrolysis gases, the reactor will produce nearly hydrocarbon-free gas. DOE

N82-11248# California Univ., Livermore. Lawrence Livermore Lab.
CONTROLLED RETRACTING INJECTION POINT (CRIP) SYSTEM: A MODIFIED-STREAM METHOD FOR IN SITU COAL GASIFICATION
R. W. Hill and M. J. Shannon 15 Apr. 1981 10 p refs Presented at the 7th Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8-11 Sep. 1981
(Contract W-7405-eng-48)
(DE81-026477; UCRL-85852; CONF-810923-2) Avail: NTIS HC A02/MF A01

The principle of moving the injection point (where the combustion-supporting air or oxygen from the surface is fed into the coal seam) to new areas of unburned coal as the burn progresses in coal gasification is investigated. The controlled retracting injection joint or CRIP system is designed to keep the injection point on the bottom of the coal seam and to move it backwards away from the collapse zone into fresh, solid coal. The principle of controlled retraction allows the operator to choose the optimum time and distance to move the injection point, and consequently the burn zone, to get the best possible performance from the gasifier. Although this system will work with coal seams of any thickness, it is particularly well suited to thick coal seams where the cavity grows by coal collapse as well as combustion. Placement of the production channel at the top of the seam, above the injection well ensures isolation from the effects of collapse and reduces the risk of plugging the production well. DOE

N82-11249# International Science and Technology Inst., Inc., Washington, D. C.
ASSESSMENT OF OIL-SHALE TECHNOLOGY IN BRAZIL Final Technical Report, 27 Oct. 1980 - 27 Jul. 1981
27 Jul. 1981 143 p refs
(Contract DE-AC01-80ER-30010)
(DE81-027574; DOE/ER-30010/1) Avail: NTIS HC A07/MF A01

This assessment investigates whether US oil shale developers might benefit from the experience gained by the Brazilians in the operation of their Usina Prototipo do Irati oil shale demonstration plant at Sao Mateus do Sul, and from the data generated from their oil shale research and development programs. A chapter providing background information on Brazil and the Brazilian oil shale deposits is followed by an examination of the potential recovery processes applicable to Brazilian oil shale. The evolution of the Brazilian retorting system is reviewed and compared with the mining and retorting proposed for US shales. Factors impacting on the economics of shale oil production in Brazil are reviewed and compared to economic analyses of oil shale production in the US. Chapters examining the consequences of shale development in terms of impact on the physical environment and the oil shale worker complete the report. DOE

N82-11250# Avco-Everett Research Lab., Mass.
PREIGNITION VOLATILE YIELD AS RELATED TO COAL CHARACTERISTICS Quarterly Report, Apr. - Jun. 1981
Jul. 1981 16 p ref
(Contract DE-AC22-80PC30290)
(DE81-027584; DOE/PC-30290/T3; FE-30290-3Q) Avail: NTIS HC A02/MF A01

Twelve coals are currently being characterized regarding their proximate and ultimate analysis, reflectance, surface area, and petrographic composition. Devolatilization experiments were completed at two temperature levels for nine of the twelve coals. In addition the effect of particle size on preignition volatile yield was been investigated for Illinois No. 6 coal. The relation between preignition volatile yield and such coal characteristics as: (1) carbon content; (2) hydrogen to carbon ratio; (3) volatile matter; (4) reflectance; (5) surface area; and (6) various functions of the petrographic composition was studied. From the coals tested thus far the most direct relation is between the volatile yield and carbon content. The AERL coal combustion model modified to allow exploration of the effect of preignition volatile yields on flame stability in a swirl burner. DOE

N82-11251# Department of Energy, Morgantown, W. Va. Energy Technology Center.
ATMOSPHERIC FLUIDIZED-BED PROJECTS TECHNOLOGY OVERVIEW
Feb. 1981 66 p refs
(DE81-027143; DOE/METC-SP-108) Avail: NTIS HC A04/MF A01

The methodology by which DOE-funded projects achieved program goals and objectives is examined. The status of the technology is reviewed, and areas where further development or research is required, and projects where this is being addressed

are identified. Current program issues include feed systems, heat transfer, recycle, air-distributor grid design, ignition characteristics, output control, particulate emissions, reliability, and fuel flexibility. DOE

N82-11252# Department of Energy, Oak Ridge, Tenn.
SOLVENT-REFINED COAL-1 DEMONSTRATION PROJECT. FINAL ENVIRONMENTAL IMPACT STATEMENT, VOLUME 1 OF 2 Final Report
Jul. 1981 700 p refs
(DE81-025983; DOE/EIS-0073-Vol-1) Avail: NTIS HC A99/MF A01

The potential environmental impacts associated with the construction and operation of a 6000-tpsd-capacity coal liquefaction facility at Newman, Kentucky which will demonstrate the technical operability, economic viability, and environmental acceptability of an SRC-I process are assessed. Impacts assessed include the following: effects of the project on occupational and public health resulting from the production and use of SRC products; potential impacts on terrestrial and aquatic ecology; potential and expected impacts on land use; withdrawal and alteration of prime agricultural land; projected effects on flood-plain and wetland areas; potential impacts on surface water and groundwater; potential impacts on ambient air quality; potential change of the cultural landscape; potential impacts on sites of archaeological significance; and changes to existing economic and social characteristics of the site area. Long-range and cumulative impacts of a future commercial expansion of the proposed facility at the proposed site to an approximately 30,000-tpsd capacity are also addressed. A construction and operational monitoring plan to assess the effectiveness of the planned mitigatory measures for the duration of the demonstration phase is presented. DOE

N82-11253# Department of Energy, Morgantown, W. Va. Energy Research Center.
SURFACE COAL GASIFICATION
Oct. 1980 48 p refs
(DE81-030183; DOE/METC-SP-110) Avail: NTIS HC A03/MF A01

The successful commercial application of surface gasification of coal could enable the United States to use from its vast deposits of coal to produce a wide variety of energy products and chemical feedstocks. The technology base is well developed and extremely flexible for converting coal into alternate products suitable for the demands of a broad and heterogeneous market and a wide array of users/owners. To meet the defined program objectives, several pilot plant and process-development operations are being conducted. Four of these operations are described: (1) combustion engineering low-Btu entrained-bed gasifier; (2) bi-gas high-Btu entrained-bed gasifier; (3) ash-agglomerating fluid-bed gasifier; and (4) the short-residence time high-Btu hydrogasifier. Gasification technology-crosscut conclusions and results of technical problems and issues common to the four pilot plants are discussed. DOE

N82-11254# Department of Energy, Morgantown, W. Va.
ADVANCED-GASIFICATION PROCESSES
Dec. 1980 66 p refs
(DE81-030184; DOE/METC-SP-183) Avail: NTIS HC A04/MF A01

An analysis of the needs for commercial gasification reveals the following principal categories of information gaps that can be filled by programs already in progress or those readily initiated. The gaps are technology base need required for successful commercialization of both currently available and advanced-gasification processes. The needs are defined further in Table 2-1, which shows the current status of the technology data base. The need areas are classified as follows: Coal Preparation/Feeding/Fins Management, Reactor Design/Performance, Gas Cleaning/Cooling, Acid Gas Removal/Gas Shift and Conversion Data Base on State-of-the-Art and Advaced Technologies, Components/Materials/Instrument Development, Health/Environmental/Safety, and General. It is anticipated that solutions to many of the problems associated with the demonstration plants, the alternative fuel plants, and the Synthetic Fuel Corporation endeavors will not be available during the design and construction phases. However, during the operating and optimization phases of most of these projects prior to commercialization, where additional will have provided the additional data base needed to correct deficiencies and/or to advance the state of the art. DOE

N82-11255# Pittsburg Energy Technology Center, Pa. Combustion Technology Div.
TRANSPORT CHARACTERISTICS OF ALTERNATE SLURRY FUELS Quarterly Technical Progress Report, Apr. - Jun. 1981
1981 5 p Sponsored by DOE
(DE81-028580; DOE/TIC-1028580) Avail: NTIS HC A02/MF A01

Progress is reported in an effort to develop flow data for various alternate fuels, such as coal/water mixtures, in a pump loop which accurately simulates fuel feed systems found in boiler and furnace applications. Instruments and procedures were selected for the measurement and correlation of pressure loss as a function of slurry characteristics and system design. An existing loop was redesigned by lengthening both the vertical and horizontal straight sections and by simplifying the tank discharge/pump suction inlet section to eliminate unnecessary bends or elbows. Locations were selected for the pressure measurements, temperature measurements, flow measurements, and grab sample ports. A data acquisition system was defined. DOE

N82-11256# California Univ., Berkeley. Lawrence Berkeley Lab. Chemical Biodynamics Div.
HYDROGEN PRODUCTION FROM THE PHOTOSYNTHETIC BACTERIUM RHODOPSEUDOMONAS SPHAEROIDES Ph.D. Thesis
B. A. Macler Jun. 1981 147 p refs
(Contract W-7405-eng-48)
(DE81-025831; LBL-12877) Avail: NTIS HC A07/MF A01

Rhodopseudomonas sphaeroides can produce H2 gas under certain conditions when supplied with an appropriate reduced carbon source. It was determined that the enzyme nitrogenase is responsible for this activity. Maximum rates of H2 biosynthesis were achieved when the organism was grown anaerobically in the light in a medium containing minimal amounts of reduced nitrogen. An atmosphere low in N2 also increased H2 yields. The organism can utilize lactate, malate, fructose or sucrose to produce H2. Ammonium ion completely inhibited H2 production completely and irreversibly in vivo when present above 8% in the atmosphere. N2 did not completely suppress H2 production at any level. Carbon monoxide at 10% in the atmosphere did not affect metabolism or inhibit H2 production. Monofluoroacetate inhibited H2 production from 10 to 70% depending on the strain and the carbon compound used for substrate. DOE

N82-11257# Brookhaven National Lab., Upton, N. Y.
FUSION AS A SOURCE OF SYNTHETIC FUELS
J. R. Powell, J. A. Fillo, and M. Steinberg 1981 10 p refs Presented at the Energy in the Man-Built Environ.: The Next Decade Specialty Conf., Vail, Colo., 3 Aug. 1981
(Contract DE-AC02-76CH-00016)
(BNL-29281; CONF-810808-2) Avail: NTIS HC A02/MF A01

Efficient production of hydrogen-based fuels from fusion is addressed. Water splitting reactions discussed include high temperature electrolysis of steam, thermochemical cycles, hybrid electrochemical/thermochemical, and direct thermal decomposition. High temperature electrolysis appears to be the simplest and most efficient process with efficiencies of 50 to 70% (Fusion to hydrogen chemical energy), depending on process conditions. DOE

N82-11258# Battelle Pacific Northwest Labs., Richland, Wash. Biomass Program Office.
TRANSPORTATION FUELS FROM SYNTHETIC GAS
E. G. Baker and R. Cuello Aug. 1981 25 p refs
(Contract DE-AC06-76RL-01830)
(DE81-029614; PNL-3951) Avail: NTIS HC A02/MF A01

Twenty-five experimental Fischer-Tropsch synthesis runs were made with 14 different catalysts or combinations of catalysts using a Berty reactor system. Two catalysts showed increased selectivity to transportation fuels compared to typical Fischer-Tropsch catalysts. With a catalyst consisting of 5 wt percent

ruthenium impregnated on a Y zeolite (run number 24), 63 to 70 wt percent of the hydrocarbon product was in the gasoline boiling range. Using a 0.5 wt percent ruthenium on alumina catalyst (run number 22), 64 to 78 wt percent of the hydrocarbon product was in the diesel fuel boiling range. Not enough sample was produced to determine the octane number of the gasoline from run number 24, but it is probably somewhat better than typical Fischer-Tropsch gasoline (approx. 50) and less than unleaded gasoline (approx. 88). The diesel fuel produced in run number 22 consisted of mostly straight chained paraffins and should be an excellent transportation fuel without further refining. The yield of transportation fuels from biomass via gasification and the Fischer-Tropsch synthesis with the ruthenium catalysts is somewhat less, on a Btu basis, than methanol (via gasification) and wood oil (PERC and LBL processes) yields from biomass. DOE

N82-11259# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.

CHEMISTRY AND CATALYSIS OF COAL LIQUEFACTION: CATALYTIC AND THERMAL UPGRADING OF COAL LIQUID AND HYDROGENATION OF CO TO PRODUCE FUELS

Quarterly Progress Report, Oct. - Dec. 1979

W. H. Wiser Aug. 1980 73 p refs

(Contract DE-AC01-79ET-14700)

(DOE/ET-14700/1) Avail: NTIS HC A04/MF A01

Studies of the chemistry and catalysis of coal hydrogenation have been initiated with the construction of a flow reactor for extraction of coal and the development of analytical techniques. Work was initiated on the design of a rotor for (13)C nuclear magnetic resonance of solid coal and extracted coal. Studies on momentum, heat and mass transfer in a fluidized bed simulated conditions for coal hydrogenation and were used to investigate effects of particle size and solids loading. The catalytic upgrading of coal-derived liquids is investigated by studies of the catalytic denitrogenation, desulfurization, deoxygenation and cracking of model compounds. Aging of Co-Mo catalysts was found to reduce the number of active sites but not the nature of the sites. A Raney catalyst is being developed for the hydrogenation of carbon monoxide. Temperature programmed desorption was used to study the properties of an iron manganese oxide catalyst previously shown to give high yields of C2-C10 hydrocarbons. DOE

N82-11260# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.

CHEMISTRY AND CATALYSIS OF COAL LIQUEFACTION: CATALYTIC AND THERMAL UPGRADING OF COAL LIQUID AND HYDROGENATION OF CO TO PRODUCE FUELS

Quarterly Progress Report, Jan. - Mar. 1980

Wendell H. Wiser Aug. 1980 70 p refs

(Contract DE-AC22-70ET-14700)

(DOE/ET-14700/2) Avail: NTIS HC A04/MF A01

Analysis of a group of coal liquids produced by catalytic hydrogenation of Utah coals with ZnCl2 catalyst was begun. Carbon-13 nuclear magnetic resonance and liquid chromatography techniques will be used to correlate chemical properties with hydrogenation reactivity. Equipment previously used for downflow measurements of heat and momentum transfer in a gas-coal suspension was modified for upflow measurements. The catalytic hydrodeoxygenation of methyl benzoate has been studied to elucidate the reactions of ester during upgrading of coal-derived liquids. The kinetics of hydrogenation of phenanthrene have also been determined. The catalytic cracking mechanism of octahydroanthracene is reported in detail. Studies of the hydrodesulfurization of thiophene indicate that some thiophene is strongly adsorbed as a hydrogen-deficient polymer on cobalt-molybdate catalyst. Part of the polymer can be desorbed as thiophene by hydrogenation. Poisoning of the catalyst inhibits the hydrosulfurization activity to a greater degree than the hydrogenation activity. Iron-manganese catalysts for carbon monoxide hydrogenation is studied to determine the role of iron carbide formation on selectivity. Pure iron catalyst forms a Hagg iron carbide phase unde reaction conditions. DOE

N82-11261# COECORP, Mountain View, Calif.

WORKSHOP PROCEEDINGS: COMBUSTION TURBINE RESIDUAL OIL

May 1981 291 p Workshop held at Atlanta, 17-18 Jul. 1980 Sponsored by EPRI

(EPRI-WS-80-132; CONF-8007109) Avail: NTIS HC A13/MF A01

Technology developed for the reliable and efficient operation of gas turbines using heavy fuel oils or alternative to petroleum distillates is described. Topics covered include combustion system design, turbine gas path design, corrosion resistant materials, turbine deposits, fuel treatment, fuel processing, and additives. Turbine operating conditions and performance are also discussed. A.R.H.

N82-11262# Los Alamos Scientific Lab., N. Mex.

HYDROGEN STORAGE-BED DESIGN FOR TRITIUM SYSTEMS TEST ASSEMBLY

Hatice S. Cullingford, Michael G. Wheeler, and John W. McMullen 1981 18 p refs Presented at the Intern. Symp. on Metal-Hydrogen Systems, Miami Beach, Fla., 13-15 Apr. 1981

(Contract W-7405-eng-36)

(DE81-025336; LA-UR-81-1906; CONF-810497-1) Avail: NTIS HC A02/MF A01

The Los Alamos National Laboratory complete the design of a hydrogen storage bed for the Tritium Systems Test Assembly (TSTA). Our objective is to store hydrogen isotopes as uranium hydrides and recover them by dehydriding. The specific use of the storage bed is to store DT gas as U(D,T)3 when it is required for the TSTA. The hydrogen storage bed consists of a primary container in which uranium powder is stored and a secondary container for a second level of safety in gas confinement. The primary container, inlet and outlet gas lines, cartridge heaters, and instrumentation are assembled in the secondary container. The design of the hydrogen storage bed is presented, along with the modeling and analysis of the bed behavior during hydriding-dehydriding cycles. DOE

N82-11263# California Univ., Livermore. Lawrence Livermore Lab.

POSSIBLE USE OF COAL IN HAWAII, 1980 - 2000

R. B. Bell 12 Feb. 1981 52 p refs

(Contract W-7405-eng-48)

(DE81-028266; UCRL-53121) Avail: NTIS HC A04/MF A01

The possibilities for the use of coal in the State of Hawaii are explored. The nature of the Hawaiian energy sector, the possible role coal could play in that sector, and some of the costs and consequences of introducing coal into the State are addressed. The technical issues connected with coal use are presented. DOE

N82-11264# California Univ., Livermore. Lawrence Livermore Lab.

CORRELATION OF SHOCK-INITIATION TESTS FOR EXPLOSIVES AND PROPELLANTS

A. M. Weston, J. R. Walton, E. James, E. Lee, and L. G. Green Jul. 1981 84 p refs Presented a the 7th Intern. Symp. on Detonation, Annapolis, 16-19 Jun. 1981

(DE81-026533; UCRL-85614; CONF-810602-31) Avail: NTIS HC A05/MF A01

Comparison among the shock initiation tests most commonly in use for evaluating explosives and propellants reveal a strong correlation of the results. Lagrange hydrodynamic calculations of the tests are employed to establish the precise nature of the correlation, but we alsc show how relatively simple approximations to the hydrodynamic results can be used to evaluate shock initiation thresholds. The results of this study provide both an equivalence relationship between the standard tests and a basis for evaluating shock initiation thresholds for hazard conditions in general. The correlations are quite reliably applied to propellants and explosives prepared at a near maximum density. Our analysis of available data shows that the correlation for porous materials is still uncertain. DOE

N82-11265# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

ALCOHOL FUELS IN THE UNITED STATES

R. R. Stiger 1981 12 p refs Presented at tht Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7 Jun. 1981

(Contract DE-AC07-76ID-01570)

(DE81-026013; CONF-810606-75) Avail: NTIS HC A02/MF A01

An overview of the social and technical issues surrounding the production of alcohol for fuels is presented. A brief analysis of the United States Alcohol Program is followed by a discussion of technical and economic factors that affect the production of alcohol fuels. DOE

N82-11266# Sandia Labs., Albuquerque, N. Mex.
HOT-SPOT INITIATION OF HETEROGENEOUS EXPLOSIVES
M. E. Kipp, J. W. Nonziato, R. E. Setchell, and E. K. Walsh (Florida Univ., Gainesville) 1981 11 p refs Presented at 7th Symp. on Detonation, Annapolis, 19 Jun. 1981
(Contract DE-AC04-76DP-00789; Grant NSF ENG-76-19677)
(DE81-027801; SAND-80-2438C) Avail: NTIS HC A02/MF A01

It is generally accepted that the shock initiation of heterogeneous explosives begins with the formation of hot spots in the vicinity of microstructural defects such as voids, grain boundaries, and phase boundaries where three can be significant localized deformation as a result of material viscosity, plastic work, and intergranular friction. This phenomenon is described in the context of a recently developed theory of chemically reacting, multiphase mixtures. In particular, we consider a granular explosive with an energetic binder (e.g. PBX-9404) and represent it as a three-phase, saturated mixture consisting of the granular reactant, the binder, phase, and the product gases. Under dynamic loading, viscous dissipation results in high temperatures in the binder phase which subsequently thermally explodes to form product gases. Decomposition of the granular reactant is achieved by laminar grain burning. This model was incorporated into a 1-D Lagrangian finite-difference code (WONDY) and e evolution of compressive shock and acceleration (ramp) waves were calculated for PBX-9404. DOE

N82-11267# California Univ., Livermore. Lawrence Livermore Lab.
LLNL UNDERGROUND COAL GASIFICATION PROJECT Quarterly Progress Report, Jan. - Mar. 1981
D. U. Olness, ed. and Wallace Clements, ed. 27 Apr. 1981 42 p refs
(Contract W-7405-eng-48)
(DE81-030634; UCRL-50026-81-1) Avail: NTIS HC A02/MF A01

Laboratory studies of forward gasification through drilled holes in small blocks of coal, approximately 1 foot on a side were conducted. Such studies give insight into cavity growth mechanisms and particulate production. However, because of the small dimensions involved, the information these tests provide is necessarily limited to aspects of cavity growth at very early times. The preliminary process design of the Tono No. 1 field experiment in Washington was completed. The experimental plan and operational strategy was developed to ensure that the injection point remains near the bottom of the coal seam and that the experiment continues at least until a period of stable operation is reached and sustained for a time. A mathematical model for the small coal block experiments in order to further our understanding of the physical and chemical processes governing the burning of the coal and the growth of the cavity within the block is being developed. Groundwater samples from wells located at distances of a few feet to several hundred feet from the gasification cavities were collected before, during, and after each of the Hoe Creek tests. The analysis of the groundwater contamination data pertinent to the Hoe Creek No. 3 test was completed. DOE

N82-11268# Pittsburg and Midway Coal Mining Co., Englewood, Colo.
SOLVENT-REFINED-COAL (SRC) PROCESS Quarterly Technical Progress Report, Jul. - Sep. 1980
Jul. 1981 219 p
(Contracts DE-AC05-76ET-10104; EX-76-C-01-0496)
(DE81-029628; DOE/ET-10104/8) Avail: NTIS HC A10/MF A01

The Fort Lewis pilot plant complete the SRC- Preheat B test program on the 2" coil. After a one week shutdown, operation was resumed in the SRC-2 mode to repeat the low heat flux test program for slurry preheater B. Process development unit-99 made three runs part of a series designed to study operations at low feed coal concentrations. Several modifications were made to improve P-99 performance capabilities. Experiments to study feed coal effect on kinetics were completed. Modeling the P-99 and Fort Lewis reactors and control of unstable steady state reactor temperature. Work was initiated to develop the cost equation system for the follow and yield matrices of the model and to study the effects of pyrite/pyrrhotite on coking of SRC-2 process streams. DOE

N82-11269# Water Resources Council, Washington, D.C.
COAL LIQUEFACTION DEMONSTRATION PLANT NEAR MORGANTOWN, WEST VIRGINIA; WATER ASSESSMENT REPORT SECTION 13(b) Final Report
Nov. 1980 40 p refs Prepared in cooperation Ohio River Basin Commission
(PB81-216095) Avail: NTIS HC A03/MF A01 CSCL 08H

Water requirements and water supply availability were assessed for a proposed coal liquefaction demonstration project at Fort Martin near Morganown, WV. A policy for consumptive use makeup and the impact on other offstream uses, navigation, and water quality are also examined. GRA

N82-11270# Water Resources Council, Washington, D.C.
COAL LIQUEFACTION DEMONSTRATION PLANT NEAR MORGANTOWN, WEST VIRGINIA: WATER ASSESSMENT REPORT Summary Report
21 Aug. 1980 14 p refs Prepared in cooperation with Ohio River Basin Commission
(PB81-216103) Avail: NTIS HC A02/MF A01 CSCL 08H

A preliminary assessment of the commercial project as currently planned is presented. Topics covered include the need for water management policies for the Ohio River Basin to regulate water distribution, as well as a pollution monitoring system. GRA

N82-11271# TRW, Inc., McLean, Va. Energy Engineering Div.
GAS RECOVERY FROM COAL DEPOSITS Final Report
A. A. Lee, C. R. Skillern, and D. R. Watkins Jan. 1981 113 p refs
(Contract GRI-5011-321-0101)
(PB81-222291; GRI-80/0033) Avail: NTIS HC A06/MF A01 CSCL 08I

The production potential of coalbeds at depth below 2500 feet was assessed and the effectiveness of hydraulic fracturing in deep coalbeds was determined. Two deep tests were performed, one in the Greater Green River Area and one in the Piceance Basin, both in Colorado. GRA

N82-11272# IDL Chemicals Ltd., Hyderabad (India). Research and Development Dept.
AC FIRING ABILITY OF DETONATION Final Report
V. Arasu, P. Satyavratan, and R. Vedam 14 Dec. 1980 21 p refs Presented at the CMRS Silver Jubilee Symp. on Appl. of Electron. and Instrumentation for Mines, Tunnels and Dams, Dhanbad, India, 14 Dec. 1980
(PB81-216053; IDL/R/D-80) Avail: NTIS HC A02/MF A01 CSCL 19A

The series firing ability of detonators when subjected to AC mains voltage is analyzed. The analysis and conclusions are made based on actual experiments conducted with the help of a custom built electronic firing system. At lower currents there exists a narrow band of critical starting angles of which misfires occur. This critical zone is explained based on a hypothesis of desensitization of the fusehead by the current flowing during the falling slope region. This phenomena is less severe at higher currents which eliminates misfires under AC mains voltage firing. GRA

N82-11273# Research Triangle Inst., Research Triangle Park, N. C.
COAL GASIFIER PARAMETERS INFLUENCING ENVIRONMENTAL POLLUTANT PRODUCTION
D. A. Green, J. G. Cleland, D. P. Daugherty, W. J. McMichael, F. O. Mixon, and R. S. Truesdale Jun. 1981 95 p refs
(Grant EPA-R-804979)
(PB81-221301; RTI/1934/00-03F; EPA-600/7-81-098) Avail: NTIS HC A05/MF A01 CSCL 21D

A series of fixed-bed coal gasification and pyrolysis tests

were performed in a laboratory scale reactor of 6.6 cm inside diameter. Chemical analyses were conducted on the product gas, the aqueous condensate, the tar, and the solid residue from the tests. The effects of process variables, such as feed mode, catalytic treatment, pressure, mesh size, and coal type, upon byproduct and pollutant yields are described. The production of gaseous sulfur compounds, benezene and derivatives (BTX), phenolics (phenol, cresols, and xylenols), and tar were measured, and the fate of trace elements such as arsenic, selenium, and lead were determined. Byproduct production associated with the pyrolysis phase of gasification was investigated with emphasis on the effects of particle size, residence time, and atmosphere. Continuous operation was found to result in greatly reduced tar and phenolic production. GRA

N82-11274# TRW, Inc., McLean, Va. Energy Systems Group.
ENVIRONMENTAL RESEARCH PLAN FOR GAS SUPPLY TECHNOLOGIES. VOLUME 2: ENVIRONMENTAL RESEARCH PLAN Final Report
L. M. Tipton 29 May 1981 168 p refs 2 Vol.
(Contract GR1-5080-351-0316)
(PB81-222317; GRI-80/0013.2) Avail: NTIS HC A08/MF A01 CSCL 21D

Federal environmental regulations affecting gas supply technologies are reviewed. The technological and environmental state of the art of each gas supply technology was analyzed with the help of a series of experts, in gas supply technology. Based on regulatory requirements technology status, and current environmental knowledge, the environmental issues associated with each technology area were identified. Environmental research being performed by government, industry and educational institutions was identified by computerized literature search and reviewed applicability recommended research activities for GRI funding were developed and a suitable prioritization methodology was devised. GRA

N82-11275# Cornell Univ., Ithaca, N. Y.
ETHANOL PRODUCTION IN SOUTHERN TIER EAST REGION OF NEW YORK: TECHNICAL AND ECONOMIC FEASIBILITY Final Report
Robert J. Kalter Mar. 1981 348 p refs Sponsored by New York State Energy Research and Development Authority
(PB81-226979; Rept-81-7; NYSERDA-81-7) Avail: NTIS HC A15/MF A01 CSCL 07A

This is the third of five region-specific feasibility studies on regional production of ethanol. It was found that deproteinized whey resources in this region of New York could support ethanol production in amounts ranging from about 1.5 million to 5 million gallons a year while also producing a high-protein, high-mineral animal feed. Ethanol is an octane booster which can be used as a gasoline extender to produce gashol. GRA

N82-11276# Missouri River Basin Commission, Omaha, Nebr.
SYNTHETIC FUEL DEVELOPMENT FOR THE UPPER MISSOURI RIVER BASIN. SECTION 13: WATER ASSESSMENT REPORT
Apr. 1981 129 p refs Sponsored in part by the Water Resources Council
(PB81-224537) Avail: NTIS HC A07/MF A01 CSCL 21D

The results of an assessment of water requirements, water supply availability and other water implication of synthetic fuel development in the Upper Missouri River Basin are summarized. The availability of water to support certain hypothetical levels of synfuel development for three types of coal conversion technologies is determined. The major effects that synfuel development could have on the water resources of the region are identified. GRA

N82-12025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANALYTICAL DESIGN FOR INTERNAL BURNING STAR GRAINS OF SOLID ROCKETS
Changtang Lu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 64-74 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-11277# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR LIGHT LADDERS
5 Nov. 1980 29 p In ENGLISH and AFRIKAANS
(SABS-1304-1980; ISBN-0-626-05677-2; GR-10) Avail: NTIS HC A03/MF A01

Requirements are given for the construction, inspection, and testing of single ladders, extension ladders, step-ladders, extending step-ladders, trestle ladders, extending trestle ladders, and special purpose ladders. The composition of the aluminum alloys, and of the steels and glass fiber reinforced polyester components coming into contact with the aluminum are included. Coatings used to provide corrosion resistance are also specified. A.R.H.

N82-11278# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR INDUSTRIAL SAFETY-BELT ASSEMBLIES
5 Nov. 1980 20 p In ENGLISH and AFRIKAANS
(SABS-809-1980; ISBN-0-626-05710-8; GR-8) Avail: NTIS HC A02/MF A01

Specifications are given for the general design, material, construction, and performance requirements for four types of industrial safety belts: (1) a waist belt; (2) a combination of a waist belt and shoulder, 11 leg, and back straps; (3) a combination of a waist belt and shoulder and back straps. Inspection procedures and test sequences are included with drawings. A.R.H.

N82-11279*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Jul. - Aug. 1981
N. A. Renzetti, ed. 15 Oct. 1981 244 p refs
(Contract NAS7-100)
(NASA-CR-164939; TDA-PR-42-65) Avail: NTIS HC A11/MF A01 CSCL 17B

Progress in the development and operations of the Deep Space Network is reported including develoments in Earth-based radio technology as applied to other research programs. These programs are: geodynamics, astrophysics, and the radio search for extraterrestrial intelligence in the microwave region of the electromagnetic spectrum. For individual titles, see N82-11280 through N82-11310.

N82-11280*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIO ASTRONOMY **c89**
R. D. Shaffer, J. T. McCluskey, S. Gulkis, M. Klein, and T. Kuiper *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 1-3 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

A K-band reflected-wave ruby maser was used on the 64-meter (DSS-43) antenna at the Tidbinbilla Tracking Station, near Canberra, Australia. Spectral line observations were carried out near 22 GHz for water vapor sources and near 24 GHz for ammonia sources. The water vapor observations were made in the direction of known southern OH and H2O maser sources. All of the previously detected water line sources examined were detected. In addition, two new water vapor maser sources were discovered, G301.1+1.1and G308.9+0.1. The spectrum of G301.0+1.1 is presented six ammonia sources were found: G291.3-0.7, G305.4+0.2, G322.2+0.6, G327.3-0.5, G333.6-0.2, and G268.4-0.8. Spectra of two of these sources, G291.3-0.7 (RCW 57) and G305.4+0.2, are presented. Both show clearly the presence of the quadrupole splitting satellite lines that will allow the determination of NH3 optical depths in these clouds. J.M.S.

N82-11281*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A DEDICATED 26-m SETI SKY SURVEY INSTRUMENT FACILITY: A FEASIBILITY STUDY **c89**
A. L. Berman and R. D. Shaffer *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 4-8 refs (For primary

document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

The feasibility of converting a deactivated GSTDN 26 m facility into a dedicated SETI Instrument Facility is examined. Additional benefits that would accrue from the proposed utilization of these facilities are the capability for remote and control the Deep Space Communications Complex (DSCC) Signal Processing Center, combined with a reduction in ground-induced radio frequency interference due to the physical distance to the other DSCC front end areas and the Signal Processing Center. J.M.S.

N82-11282*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DSN GROUND COMMUNICATION FACILITY c32
R. H. Evans *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 9-18 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

A functional description of the GCF and its relationships with other elements of the DSN and NASCOM is presented together with development objectives and goals and comments on implementation activities in support of flight projects. Author

N82-11283*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NETWORKS CONSOLIDATION PROGRAM c14
M. L. Yeater and D. T. Herrman *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 19-24 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

A single consolidated network of ground tracking stations to replace the present two ground-based spacecraft tracking networks is proposed. The proposed consolidated network uses facilities that are now included in the Ground Spaceflight Tracking and Data Network (GSTDN), operated by Goddard Space Flight (GSFC), as well as the existing Deep Space Network (DSN), operated by Jet Propulsion Laboratory (JPL). These facilities are combined and modified to provide a consolidated network managed and operated by JPL and capable of supporting the set of planetary and Highly Elliptical Earth Orbiter (HEEO) missions planned for the Tracking and Data Relay Satellite System (TDRSS) era. The consolidated network is planned to be operational after the TDRSS becomes operational. It will continue to support planetary missions that are now supported by the DSN and also provide support to a broad class of other spacecraft missions which are not compatible with or which, for other reasons, cannot be supported by the TDRSS. J.M.S.

N82-11284*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DSN MODEL FOR USE IN STRATEGIC PLANNING c81
K. C. Kelly, C. Y. Lin, and M. McKenzie *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 25-31 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

A System Dynamics Model of the DSN to support strategic planning for the Network is addressed. Applications for the model are described, as well as the foundations of system dynamics and the methodology used to develop the model. Activities to date and plans for future work are also discussed. J.M.S.

N82-11285*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PIONEERS 6 THROUGH 12 MISSION SUPPORT c14
R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 32-33 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 22D

The continuing efforts of the Deep Space Network in support of Pioneer Mission Operations during the cruise phases of the Pioneers 6 through 11 spacecraft and Pioneer Venus orbital operations are discussed. J.M.S.

N82-11286*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
STRATEGIES FOR WEATHER-DEPENDENT DATA ACQUISITION c32
E. C. Posner *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 34-46 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

A strategy for data acquisition from a very distant spacecraft is presented, when the system performance can be severely degraded by the Earth's weather due to the high microwave frequency being used. When there is no minimum rate to be maintained, the optimum strategy is the greedy strategy, which always transmits at the single rate which maximizes the expected data returned. If there is a minimum data rate, the optimum strategy transmits simultaneously at the minimum or base data rate and at a bonus data rate. A coding system designed for the bandwidth-constrained degraded broadcast channels used. The optimum version of this system can, under realistic assumptions, save on the order of 5 dB over the conservative strategy of just transmitting at a single lower data rate. J.M.S.

N82-11287*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VIRTUAL CENTER ARRAYING c32
L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* the Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 47-52 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

Methods to increase the amount of data that can be received from outer planet missions are described with emphasis on antenna arraying systems designed to increase the total effective aperture of the receiving system. One such method is virtual center arraying (VCA). In VCA, a combined carrier reference is derived at a point that is, conceptually, the geometric center of the array. This point need not coincide with any of the actual antennas of the array. A noise analysis of the VCA system is given along with formulas for the phase jitter as a function of loop bandwidths and the amount of loop damping. If the ratio of the loop bandwidths of the center loop to the vertex loops is greater than 100, then the jitter is very nearly equal to that expected for ideal combined carrier referencing. J.M.S.

N82-11288*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DEEP SPACE OPTICAL CHANNEL. 2: WAVE PROPAGATION EFFECTS c74
J. Katz *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 53-58 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

Propagation effects of optical waves in the deep space optical channel with a spacebased receiver are analyzed. It is found that these effects are negligible for all practical interplanetary systems designs. Author

N82-11289*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SYMBOL ERROR RATE PERFORMANCE EVALUATION OF THE LM37 MULTIMEGABIT TELEMETRY MODULATOR-DEMODULATOR UNIT c17
H. Malek *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 59-74 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09F

The LM37 multimegabit telemetry modulator-demodulator unit was tested for evaluation of its symbol error rate (SER) performance. Using an automated test setup, the SER tests were carried out at various symbol rates and signal-to-noise ratios (SNR), ranging from +10 to -10 dB. With the aid of a specially designed error detector and a stabilized signal and noise summation unit, measurement of the SER at low SNR was possible. The results of the tests show that at symbol rates below 20 megasymbols per second (MS)s) and input SNR above -6 dB, the SER performance of the modem is within the specified 0.65 to 1.5 dB of the theoretical error curve. At symbol rates above 20 MS/s, the specification is met at SNR's down to -2 dB. The results of the SER tests are presented with the description of the test setup and the measurement procedure. J.M.S.

N82-11290*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RFI CHANNELS, 2 **c32**
R. J. McEliece *In its* The Telecommun. and Data Acquisitions Rept. 15 Oct. 1981 p 75-80 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

The cutoff parameters for a class of channel models exhibiting burst noise behavior were calculated and the performance of interleaved coding strategies was evaluated. It is concluded that, provided the channel memory is large enough and is properly exploited, interleaved coding is nearly optimal. L.F.M.

N82-11291*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE R SUB 0 PARAMETER FOR THE GAUSSIAN CHANNEL **c32**
R. J. McEliece and E. R. Rodemich *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 81-85 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

The cutoff R sub 0 for the additive white Gaussian channel is first defined and then computed. This important channel parameter seems not to have been previously computed for this important channel model except in the case when the input is restricted to be binary. Author

N82-11292*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DESIGN OF THROAT SECTION OF CONICAL CORRUGATED HORNS **c32**
A. D. Olver *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 86-93 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

A simple graphical method is presented for designing the junction between a conical corrugated horn and a smooth-wall circular waveguide. The method gives both an insight into the field behavior along the horn and an indication of the reflection coefficient at the horn-waveguide junction. It has been applied to the design of the DSN X-S band feedhorn and an improved corrugated throat section. Author

N82-11293*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CRYOGENIC FILTERS FOR RFI PROTECTION **c33**
J. J. Bautista and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 94-98 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

The increased bandwidth and sensitivity of the DSN maser-based receiver systems along with the increase in worldwide microwave spectrum usage dictated the need for employing additional measures to protect these systems from RFI (radio frequency inerference). Both in-band and out-of-band microwave signals at the input of the Deep Space Network (DSN) traveling wave masers (TWM) can adversely affect the maser performance in a variety of ways. Filters fabricated from superconducting materials operating below their superconducting transition temperature (Tc) possess the most potential for providing the necessary RFI protection without degrading the system performance. Author

N82-11294*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TRAVELING-WAVE MASER, CLOSED CYCLE REFRIGERATOR AUTOMATION **c36**
J. A. McNeil (Loyola Marymount Univ., Los Angeles) and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 99-103 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

At the present time all traveling-wave maser and closed-cycle refrigerator system (TWM-CCR) and their power supply and helium compressor assemblies are operated manually. Many man-hours are required of highly trained and experienced operators, resulting in high operator cost. Of greater importance are the problems of unpredictable failure and long downtimes. Since field performance is not monitored, system degradation is detected only when it has progressed to the point of catastrophic failure. Without the aid of performance histories, failure diagnosis is arduous and slow. Rational and functional requirements for the TWM-CCR Automation project are the following: (1) to improve reliability and reduce downtime by providing unattended monitor and control, alarm and fault location, failure prediction and self-corrective action; (2) to reduce operator cost by providing automatic tuning and cooldown procedures; and (3) to improve system operations and development by providing the needed engineering data. L.F.M.

N82-11295*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DIGITAL SAR PROCESSING USING A FAST POLYNOMIAL TRANSFORM **c32**
S. Butman, R. Lipes, A. Rubin, and T. K. Truong *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 104-112 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

A new digital processing algorithm based on the fast polynomial transform is developed for producing images from Synthetic Aperture Radar data. This algorithm enables the computation of the two dimensional cyclic correlation of the raw echo data with the impulse response of a point target, thereby reducing distortions inherent in one dimensional transforms. This SAR processing technique was evaluated on a general-purpose computer and an actual Seasat SAR image was produced. However, regular production runs will require a dedicated facility. It is expected that such a new SAR processing algorithm could provide the basis for a real-time SAR correlator implementation in the Deep Space Network. Author

N82-11296*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MINIMIZING THE TIME TO TROUBLESHOOT A FAILED SYSTEM **c38**
E. J. Subelman (California Univ., Los Angeles) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 113-117 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 14D

A procedure is presented to determine the order in which to inspect the components of a failed series system so as to minimize the expected time until the failed component is isolated. The model includes the case in which inspection of a component may falsely indicate the component is functioning. Author

N82-11297*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN ERROR BUDGET FOR THE JPL HYDROGEN MASER RECEIVER **c36**
C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 118-126 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

The hydrogen maser receiver is a synthesizer that converts the maser signal, at about 1420 MHz, to a set of output signals at 100, 20, 10, 5, 1, and 0.1 MHz. The contribution of the receiver and its component modules to the frequency instability and phase noise of each of its outputs is estimated, and these results are compared to published measurements of the 100-MHz output of the frequency standard, which consists of a maser plus its receiver. One can then assess how much the receiver degrades the performance of the frequency standard. L.F.M.

N82-11298*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REMOVAL OF DRIFT FROM FREQUENCY STABILITY MEASUREMENTS **c32**
C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 127-132 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

A method of estimating frequency drift rate and removing its effect from Allan variance plots is given. When tried on a test of hydrogen masers, the methods gives consistent results. An error in the previous Allan variance computation algorithm is corrected. Author

N82-11299*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CLOSED FORM EVALUATION OF SYMMETRIC TWO-SIDED COMPLEX INTEGRALS **c65**

R. Winkelstein *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 133-141 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 12A

Evaluation of two-sided complex integrals is often required when analyzing linear systems to determine signal variances resulting from stochastic inputs and system noise bandwidths. Algebraic solutions of integrals in a closed matrix equation form, using coefficients of the numerator and denominator polynomials, are presented. The closed forms provide the possibility of obtaining some insight into parameter sensitivity in addition to greatly reducing the computational complexity required by the normal method of evaluation by residues. T.M.

N82-11300*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SURFACE RESISTIVITY MEASUREMENTS OF CANDIDATE SUBREFLECTOR SURFACES **c33**

E. H. Thom and T. Y. Otoshi *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 142-150 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 09C

Subreflectors on DSN antennas have historically been of formed and welded sheet metal construction, which is quite costly. Flame-spray metallized fiberglass-epoxy offers an alternative technique at much lower cost. Results of a study to show that system noise temperature would be increased about 0.3 K at X-band when using the alternate material is presented. T.M.

N82-11301*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

REHABILITATION OF 64-METER-ANTENNA RADIAL BEARING **c37**

H. McGinness and G. Gale *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 151-161 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 13I

The performances of the radial bearings on three 64-meter antennas are presented. Explanations for the distortion of the bearing at DSS 14 are made and the repairs are described. Recommendations for future tests and action are given. T.M.

N82-11302*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE QUALITY ASSURANCE ROLE IN THE DEEP SPACE NETWORK **c38**

R. L. Sirpilla *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 162-168 ref (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 14D

The quality assurance section provides skilled personnel who perform the following functions: quality hardware engineering, quality software engineering, inspection and testing, and an independent assessment to quality, engineering and project requirements. The quality assurance section provides specifications, workmanship standards, process specifications and quality assurance procedures in support of DSN equipment. In addition, the quality assurance section reviews DSN engineering documents to ensure that appropriate and adequate quality provisions are included. T.M.

N82-11303*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NETWORKS CONSOLIDATION PROGRAM: MAINTENANCE AND OPERATIONS (M&O) STAFFING ESTIMATES **c14**

J. P. Goodwin *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 167-174 ref (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 22D

The Mark IV-A consolidate deep space and high elliptical Earth orbiter (HEEO) missions tracking and implements centralized control and monitoring at the deep space communications complexes (DSCC). One of the objectives of the network design is to reduce maintenance and operations (M&O) costs. To determine if the system design meets this objective an M&O staffing model for Goldstone was developed which was used to estimate the staffing levels required to support the Mark IV-A configuration. The study was performed for the Goldstone complex and the program office translated these estimates for the overseas complexes to derive the network estimates. T.M.

N82-11304*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NOCA UPGRADE **c14**

G. D. Gould *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 175-179 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 22D

The network operations control area (NOCA) of the space flight operations facility (SFOF) is being upgraded in both hardware and software capabilities to provide the visibility and operability necessary for the operations control function to be performed within the present technological environment of the tracking network. The hardware implementation currently in progress is addressed. It provides a standard operating console with increased display capacity and improved ergonomics as a replacement for the existing, outmoded, circular consoles original to the SFOF. T.M.

N82-11305*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RELOCATION OF THE DEEP SPACE NETWORK MAINTENANCE CENTER **c14**

K. F. Beutler *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 180-181 (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 22D

The Jet Propulsion Laboratory maintains a Deep Space Network (DSN) maintenance center (DMC), whose task is to engineer and manage the repair and calibraion program for the electronic and mechanical equipment used in the tracking stations located at Madrid, Spain, and Canberra, Australia. The DMC also manages the Goldstone complex maintenance facility (GCMF), whose task is to repair and calibrate the Goldstone electronic and mechanical equipment. The rationale for moving the facility to Barstow, California, and the benefits derived from the move are discussed. T.M.

N82-11306*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GOLDSTONE (GDSCC) ADMINISTRATIVE COMPUTING **c60**

H. Martin *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 182-191 (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 09B

The GDSCC Data Processing Unit provides various administrative computing services for Goldstone. Those activities, including finance, manpower and station utilization, deep-space station scheduling and engineering change order (ECO) control are discussed. T.M.

N82-11307*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1980 **c14**

E. B. Jackson and J. W. Hudson (Bendix Field Engineering Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 192-196 (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 22D

In addition to direct spacecraft project support, the GDSCC antennas also support special activities. These activities can be categorized as advanced system program, crustal dynamics program, and radio astronomy program activities. The goals of these types of activities that received tracking support at Goldstone are discussed. All Goldstone stations (DSSs 11, 12, 13, and 14) provided a total of 2814.5 tracking hours to special activities during the period January through December 1980. T.M.

N82-11308*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GOLDSTONE HIGH POWER RADIATION CONTROL **c32**

B. A. Gaudian and R. B. Cushman (Bendix Field Engineering

Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 197-204 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20I

The airspace near Goldstone is shared by many users in carrying out their respective missions. Coordination of Goldstone high power transmitter radiation activity with mutual airspace users near Goldstone is an effective method to prevent aircraft from being exposed to radiation levels greater than 10 mW/sq cm, to allow Goldstone to transmit high power levels for planetary radar experiments and to provide the necessary information to both civil and military aircraft users to enable them to perform their necessary activities. T.M.

N82-11309*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PLANETARY RADAR c32
R. D. Shaffer, J. T. McCluskey, and G. S. Downs *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 205 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

The radar astronomy activities supported by the Deep Space Network during the third quarter of FY81 are reported. The planet Mercury was the principal object of interest. T.M.

N82-11310*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN OPTIMIZATION MODEL FOR ENERGY GENERATION AND DISTRIBUTION IN A DYNAMIC FACILITY c81
F. L. Lansing *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 206-222 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

An analytical model is described using linear programming for the optimum generation and distribution of energy demands among competing energy resources and different economic criteria. The model, which will be used as a general engineering tool in the analysis of the Deep Space Network ground facility, considers several essential decisions for better design and operation. The decisions sought for the particular energy application include: the optimum time to build an assembly of elements, inclusion of a storage medium of some type, and the size or capacity of the elements that will minimize the total life-cycle cost over a given number of years. The model, which is structured in multiple time divisions, employ the decomposition principle for large-size matrices, the branch-and-bound method in mixed-integer programming, and the revised simplex technique for efficient and economic computer use. T.M.

N82-11311*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FIREFIGHTING MODULE DEVELOPMENT
Ralph A. Burns Oct. 1981 76 p refs
(NASA-TM-82444) Avail: NTIS HC A05/MF A01 CSCL 13L

The firefighting module is a lightweight, compact, self contained, helicopter-transportable unit for fighting harbor and other specialty fires as well as for use in emergency water pumping applications. Units were fabricated and tested. A production type unit is undergoing an inservice evaluation and demonstration program at the port of St Louis. The primary purpose is to promote enhanced harbor fire protection at inland and coastal ports. The module and its development are described. S.L.

N82-11312*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STIRLING CYCLE CRYOGENIC COOLER Patent Application
Allen Sherman, Max G. Gasser, Phillip A. Studer, Michael Goldowsky (Philips Labs., Briarcliff Manor, N.Y.), and Alexander Daniels (Philips Labs., Briarcliff Manor, N.Y.) Filed 2 Oct. 1981 26 p
(NASA-Case-GSC-12697-1; US-Patent-Appl-SN-308204) Avail: NTIS HC A03/MF A01 CSCL 13I

A long lifetime Stirling cycle cryogenic cooler particularly adapted for space applications comprised of a compressor section centrally aligned end to end with an expansion section and respectively including a reciprocating compressor piston and displacer radially suspended in interconnecting cylindrical housings by active magnetic bearings and having adjacent reduced clearance regions. One or more of these regions operates as clearance seals. The piston and displacer are reciprocated in their housings by linear drive motors to vary the volume of respectively adjacent compression and expansion spaces which contain a gaseous working fluid and a thermal regenerator to effect Stirling cycle cryogenic cooling. Electrical circuit means are included for energizing the magnetic bearings and for controlling the stroke amplitudes and relative phase angle between the compressor piston and displacer during the cooling cycle. NASA

N82-11313# New Mexico Univ., Albuquerque. Engineering Research Inst.
DESIGN OF AIRPORT PAVEMENTS FOR EXPANSIVE SOILS Final Report
R. Gordon McKeen Jan. 1981 198 p refs
(Contract F29601-76-C-0051)
(AD-A104660; NMERI-AP-37; FAA-RD-81-25) Avail: NTIS HC A09/MF A01 CSCL 08/13

Expansive soil subgrades exhibit volume changes with variation in moisture condition. These changes result in differential movement of airport pavements resting on these soils. Special design procedures must be used to account for the expansive soil activity during equilibration. In addition, special precautions are required to protect the subgrade from moisture variation with climate. Measurement of soil suction is a key step in quantifying moisture-induced soil behavior. Procedures are outlined for suction characterization of the soil and for estimating the in situ differential movement likely to occur under the pavement. Once the wavelength and amplitude characteristics of the differential movement are obtained, design calculations to select the thickness and materials for the pavement may proceed. GRA

N82-11314# Coastal Engineering Research Center, Fort Belvoir, Va.
AN INEXPENSIVE, PORTABLE VIBRACORING SYSTEM FOR SHALLOW-WATER AND LAND APPLICATION
Kenneth Finkelstein Jul. 1981 16 p refs
(AD-A104323; CERC-CETA-81-8) Avail: NTIS HC A02/MF A01 CSCL 14/2

A portable vibracoring system provides an efficient, rapid, and safe means of extracting cores up to 33 feet (10 meters) long. Short cores (< 10 feet or 3 meters long) are also obtained with a part of the system. This report describes the system and the coring procedures for intrusion, extraction, and packaging. The coring system is composed of the following modifications of existing designs: (a) a quick fasten-release clamp that attaches the vibrator head to the coring pipe (the clamp moves up and down the coring pipe like a 'sleeve,' eliminating having to completely remove the unit) and (b) a stable tripod with four separate, portable components. During extraction, the core is stabilized in a vertical position by a spring-loaded metal gate, using a core pipe slot cut into the tripod headplate, until extraction is completed. Author (GRA)

N82-11315# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
PROBABILISTIC MODELING OF SUBGRADE SOIL STRENGTHS Final Report
Yu T. Chou Sep. 1981 76 p refs
(DA Proj. 4A1-61101-A9-1D)
(AD-A104336; WES/MP/GL-81-5) Avail: NTIS HC A05/MF A01 CSCL 13/2

A concept of spatial average in probabilistic modeling of subgrade soil strength is presented. The advantage of the application of spatial average to pavement engineering is explained. The link between the concept and the overall probability-based pavement design procedure is formulated and explained. In the earlier part of the report, a literature review of the concept and procedure of probabilistic design of pavements, which includes the concepts of variations and reliability, is presented. Finally, an outline of a probability based pavement design procedure for the Corps of Engineers is presented. Author (GRA)

N82-11316# Mid-American Solar Energy Complex, Bloomington, Minn.

MASEC SOLAR 80 HOME DESIGNS
1980 19 p
(DE81-028344; MASEC-PA-80-007) Avail: NTIS HC A02/MF A01

Plans of passive solar homes designed by ten teams from various sections of the mid-American region are presented. The energy efficient designs use up to 80% less fossil fuel energy for heating than those built to conventional construction standards. Energy conserving and passive design techniques are discussed. The design features of the ten (RidgeWay, ClaireMont, SolarWay, KirkWood, SunSource, ParkLand, CedarWood, SunRise, SunCrest, and WaterFord) homes are presented. DOE

N82-11317# Argonne National Lab., Ill.
SITE AND NEIGHBORHOOD DESIGN (SAND): DEVELOPMENT OF SIMPLIFIED AUTOMATED BUILDING THERMAL LOAD PROCEDURES, PHASE 1
G. T. Diderrich and R. A. Hrabak Jul. 1980 116 p refs
(Contract W-31-109-eng-38)
(DE81-027138; ANL/CNSV-TM-68) Avail: NTIS HC A06/MF A01

Preliminary efforts toward the development of simplified procedures for estimating the thermal-loads of buildings are presented. The acquisition implementation, and documentation of the thermal load procedures and associated data files actually used by the five SAND participants are described. DOE

N82-11318# American Society of Heating, Refrigerating and Air-Conditioning Engineers, New York. Subcommittee for Simplified Energy Analysis.
ENERGY ANALYSIS SAMPLE BUILDING DATA
Mar. 1981 34 p refs
(Contract DE-AC01-78CS-20057)
(DE81-027188; DOE/CS-20057/T5) Avail: NTIS HC A03/MF A01

Sample building data for energy calculations necessary for the comparative analysis between the proposed energy calculation procedure and the procedures using comprehensive hourly simulation of HVAC systems are presented. The comparison calculation includes data for the terminal reheat system, double-duct system, heat reclaim system, and standard VAV system for a hypothetical 20-story office building in Washington, DC. Each is evaluated in conjunction with electric centrifugal chiller and gas-fired boiler. DOE

N82-11319# American Society of Heating, Refrigerating and Air-Conditioning Engineers, New York. Subcommittee for Simplified Energy Conversion.
PROPOSED SIMPLIFIED ENERGY CALCULATION PROCEDURE FOR USE IN ENERGY CONSERVATION STANDARDS ACTIVITIES
Tammi Kasuda Mar. 1981 90 p refs
(Contract DE-AC01-78CS-20057)
(DE81-027190; DOE/CS-20057/T6) Avail: NTIS HC A05/MF A01

In order to circumvent various difficulties involved in using the computer simulation-based building energy analysis procedure, a simplified manual procedure suitable for commercial buildings (internal and solar heat gain dominating over the envelope conduction heat transfer) was developed. This modified bin method compared favorably with seven computer simulation-based procedures, at least for a typical office building analysis, for Washington, DC climate. The basic principle of the proposed procedure, sample building data, and the results of parallel calculations with seven computer simulation-based energy analysis programs are described. DOE

N82-11320# Battelle Pacific Northwest Labs., Richland, Wash.
SAMPLING DESIGN FOR THE 1980 COMMERCIAL AND MULTIFAMILY RESIDENTIAL BUILDING SURVEY
W. M. Bowen, A. R. Olsen, and A. L. Nieves Jun. 1981 98 p
(Contract DE-AC06-76RL-01830)
(DE81-028783; PNL-3883) Avail: NTIS HC A05/MF A01

The extent to which new building design practices comply with the proposed 1980 energy budget levels for commercial and multifamily residential building designs (DEB-80) can be assessed by: (1) identifying small number of building types which account for the majority of commercial buildings constructed in the U.S.A.; (2) conducting a separate survey for each building type; and (3) including only buildings designed during 1980. For each building, the design energy consumption (DEC-80) will be determined by the DOE2.1 computer program. The quantity X = (DEC-80 - DEB-80). These X quantities can then be used to compute sample statistics. Inferences about nationwide compliance with DEB-80 may then be made for each building type. Details of the population, sampling frame, stratification, sample size, and implementation of the sampling plan are provided. DOE

N82-11321# DCS Corp., Washington, D.C.
ASSESSMENT OF BUILDING DIAGNOSTICS
George E. Courville Jul. 1981 118 p refs Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-027078; ORNL/Sub-80/61602/1) Avail: NTIS HC A06/MF A01

The building diagnostics requirements for in-situ or field measurements on energy consumption in conditioned spaces and on heat gain and loss in residential and nonresidential buildings are evaluated. Energy audit programs, energy performance monitoring, energy flow in buildings, and use of computer technology are considered. A diagnostics program is outlined. DOE

N82-11322# Oak Ridge National Lab., Tenn.
ASSESSMENT OF ROOFING RESEARCH
James N. Robinson Jul. 1981 59 p refs
(Contract W-7405-eng-26)
(DE81-027077; ORNL/TM-7640) Avail: NTIS HC A04/MF A01

Problems related to roofing are assessed within the context of energy conservation. Appropriate actions for existing roofs, new roofs, and future roofs are ordered into a thermally efficient roofing plan, and priorities for its implementation are proposed. The methodology used in performing the assessment, an overview of issues encountered during the assessment, and the thermally efficient roofing plan that is recommended for implementation are given. DOE

N82-11323# National Bureau of Standards, Washington, D.C.
ENERGY ANALYSIS FOR A SAMPLE BUILDING BY THE PROPOSED ASHRAE SIMPLIFIED METHOD
T. Kasuda and K. Ishii Jan. 1981 265 p
(Contract DE-AC01-78CS-20057)
(DE81-027189; DOE/CS-20057/T4) Avail: NTIS HC A12/MF A01

An energy analysis of a sample office building located in Washington, DC using the proposed ASHRAE method is presented. Calculations for space load are presented. The calculations for the energy distribution systems (air conditioning, outdoor air control, humidity control, airduct systems) are given. Equipment system calculations, and calculations for the annual energy consumption for air conditioning are presented. DOE

N82-11324# Syracuse Research Corp., N. Y. Energy Research Center.
THREE PROTOTYPE DESIGNS FOR AN EXTERIOR-MOUNTED, INTERIOR-OPERATED, MOVABLE INSULATION SYSTEM Final Report
Greg Dike, David Florey, Arthur Levy, Seymour Sacks, and Laurence Kinney Mar. 1981 357 p Sponsored in part by the New York State Energy Research and Development Authority
(Contract DE-FC02-80CS-30584)
(DE81-025586; DOE/CS-30584/1) Avail: NTIS HC A16/MF A01

Design, construction, and preliminary testing of three exterior-mounted, interior-operated, movable window insulation systems are described. Two of the systems are hinged insulated shutter systems and the third is a sliding shutter system. The advantages of such systems are discussed. Development, schematics, and operation of the prototype systems are described. The thermal performance of the prototype shutters is analyzed. A preliminary market assessment study is reported. The prototype fabrication and test plan and estimated costs of the proposed designs are presented. DOE

N82-11325# Booz-Allen and Hamilton, Inc., Bethesda, Md. Energy and Environment Div.
USER NEEDS FOR SOLAR DECISION-MAKING TOOLS: THE HOMEBUILDING INDUSTRY Final Report
Min Kantrowitz, John Kurtz, and Kimball Hart 1981 131 p refs Prepared in cooperation with Midwest Research Inst., Golden, Colo.
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-027293; SERI/TR-98252-1b) Avail: NTIS HC A07/MF A01

The need for decision tools and design tools to be used by decision makers considering using solar energy in the single-family residential construction sector was studied. Three builder groups were found based upon decision making patterns relative to innovation and a five-step decision process. Eleven existing design tools were reviewed against identified user needs. The principal conclusions are that decision tools are largely lacking and design tools do not easily fit user needs. Recommendations for further study are made. DOE

N82-11326# Lehigh Univ., Bethlehem, Pa. Dept. of Civil Engineering.
SEISMIC RESISTANCE CHARACTERISTICS OF REINFORCED CONCRETE BEAM-SUPPORTED FLOOR SLABS IN BUILDING STRUCTURES: CONTRIBUTION OF FLOOR SYSTEMS TO EARTHQUAKE RESISTANCE OF BUILDING STRUCTURAL FRAMES
Masayoshi Nakashima, Ti Huang, and Le-Wu Lu Apr. 1981 353 p refs
(Grant NSF ENV-76-00715)
(PB81-219172; FEL-422.9) Avail: NTIS HC A16/MF A01 CSCL 13M

The in-plane seismic characteristics of reinforced concrete floor slabs which function as diaphragms placed between lateral load resisting systems were investigated. The floor slab system with edge beams, referred to as the beam-supported floor system is the focus of study. The experimental study, analytical study, parametric study, and dynamic response analysis are presented. Author

N82-11327# Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
STOCHASTIC MODELS FOR DEPENDENT LOAD PROCESSES
Y. K. Wen and H. T. Pearce Mar. 1981 81 p refs
(Grant NSF CME-79-18053)
(PB81-219735; SER-489; UILU-ENG-81-2002) Avail: NTIS HC A05/MF A01 CSCL 13M

Stochastic models for dependent loads and load effects are presented. The effects of stochastic dependencies on load combination and structural reliability were investigated in the context of summation of pulse processes in which occurrence time, intensity, and duration are allowed to be correlated within each process and between processes. Approximate analytical solutions based on a load coincidence method were obtained and verified by Monte-Carlo simulations. It is found that while within-load positive correlations may generally have only moderate effect on the combined load probability, between-load dependencies may be dominant factors and significantly increase the probability of threshold level being exceeded by the combined load. Author

N82-11328# California Polytechnic State Univ., San Luis Obispo. Dept. of Architectural Engineering.
RACKING TESTS OF NON-STRUCTURAL BUILDING PARTITIONS (THE BEHAVIOR OF ARCHITECTURAL (NONSTRUCTURAL) BUILDING COMPONENTS DURING EARTHQUAKES) Final Technical Report
Satwant S. Rihal Dec. 1980 114 p refs
(Grant NSF PFR-78-23085)
(PB81-220790; ARCE-R80-1; NSF/RA-800526) Avail: NTIS HC A06/MF A01 CSCL 13M

The effects of inter-story displacement (drift) during simulated earthquake conditions are reported. The correlation between inter-story relative displacement and building partition behavior, the threshold levels of partition damage, and the fundamental characteristics of non-structural building partitions (stiffness, energy absorption capacity, and strength) under horizontal racking actions were investigated. Parameters in this study consist of geometry of partition configuration and placement of gypsum wallboard panels. Author

N82-11329# North Carolina State Univ. at Raleigh. School of Engineering.
EVALUATION OF BASE COURSES FOR FLEXIBLE PAVEMENTS Final Report
W. G. Mullen and B. D. Barnes Feb. 1981 100 p refs Prepared in cooperation with the North Carolina Dept. of Transportation and Highway Safety, and DOT-FHA
(PB81-218372; ERSD-100-67-5; FHWA/MC-81/002) Avail: NTIS HC A05/MF A01 CSCL 13B

Nineteen pavement sections monitored over a period of approximately ten years were evaluated to determine the influence of base course parameters on the performance of primary flexible pavement systems in Piedmont, North Carolina. The present serviceability rating concept was used as a measure of performance. The findings that indicate roughness measures are insensitive to changes in subjective performance and that present design procedures are adequate and probably conservative for the pavements studied. Bituminous concrete base courses are not necessarily structurally superior to coarse aggregate base courses, and Benkleman beam deflections are poor indicators of performance. Author

N82-11330# Oklahoma Dept. of Transportation, Oklahoma City. Research and Development Div.
BEARING CAPACITY AND CHARACTERIZATION OF COMPRESSIBLE CLAYEV AND SILTY FOUNDATION SOILS IN OKLAHOMA Final Report, 1 Jul. 1975 - Dec. 1980
Curtis J. Hayes Dec. 1980 81 p refs Prepared of FHA, Oklahoma City, Okla.
(Research Proj. 71-08-1)
(PB81-231607; FHWA/OK-81/3) Avail: NTIS HC A05/MF A01 CSCL 08M

A characterization of alluvial soils in two river systems from the surface down to bedrock is presented. Study sites were located in alluvial deposits where fill settlement is a problem. Continuous undisturbed soil samples were taken. Unconfined compression and consolidation tests were run on the soil layers. The field testing included the standard penetration test. Inclinometers were installed in an attempt to determine if creep existed in the weak soil layers of the alluvium. GRA

N82-11331# Sydney Univ. (Australia). Civil Engineering Labs.
A REVIEW OF THE BEHAVIOUR AND ENGINEERING PROPERTIES OF CARBONATE SOILS
H. G. Poulos Dec. 1980 50 p refs Sponsored in part by Australian Research Grants Committee
(PB81-226722; R-381) Avail: NTIS HC A03/MF A01 CSCL 08M

The nature and origins of carbonate soil deposits are reviewed and methods of classifying such soils are discussed. Data on their engineering behavior is then presented, including shear strength properties, compressibility and consolidation characteristics, and their response to cyclic loading. GRA

N82-11332# Virginia Highway and Transportation Research Council, Charlottesville.
JOINTLESS BRIDGES Final Report, 1 Jul. 1980 - 1 Jun. 1981
William Zuk Jun. 1981 47 p refs
(PB81-227738; FHWA/VA-81/48; VHTRC-81-R48) Avail: NTIS HC A03/MF A01 CSCL 13C

Various methods states are employing to reduce the number of joints in bridge decks are surveyed. The most common method is the use of integral abutments, where the superstructure is jointed to a flexible type of abutment. New methods of reducing the number of joints in a bridge are analyzed mathematically, and from the analysis conclusions are drawn as to the feasibility of these methods. GRA

N82-11333# Bureau of Mines, Boulder City, Nev. Metallurgy Engineering Lab.
MODIFIED-SULFUR CEMENTS FOR USE IN CONCRETES, FLEXIBLE PAVINGS, COATINGS, AND GROUTS

W. C. McBee, T. A. Sullivan, and B. W. Jong May 1981 30 p refs
(PB81-226870; BM-RI-8545) Avail: NTIS HC A03/MF A01 CSCL 13C

A family of modified-sulfur cements was developed for the preparation of construction materials with improved properties. Various types of sulfur cements were prepared by reacting sulfur with mixtures of dicyclopentadiene and oligomers of cyclopentadiene. Durable cements were prepared with structural characteristics ranging from rigid to flexible. These cements were used to prepare corrosion-resistant materials for use in a wide variety of industrial applications where resistance to acidic and salt conditions is needed. These materials were prepared as rigid concretes, flexible pavings, spray coatings, and grouts. Production of modified-sulfur cements in a commercial-size plant was demonstrated. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking*.

N82-11334 British Broadcasting Corp., Kingswood (England).
THE USE OF REMOTE ACTIVE DEFLECTORS FOR FEEDING UHF RELAY STATIONS
G. H. Millard Sep. 1981 15 p refs
(BBC-RD-1981/5) Avail: British Broadcasting Corp., Tadworth, Surrey, England

The role of active deflectors in providing program feeds to uhf television relay stations is discussed. Particular attention is given to the provision of power supplies at sites remote from electricity supplies. Author

N82-11335 Royal Aircraft Establishment, Bedford (England). Library.
DETERMINATION OF THE SPECTRA OF MODULATED PULSE TRAINS BY THE SPECTRAL FUNCTION METHOD
M. V. Laufer and V. G. Strogii Mar. 1981 9 p refs Transl. into ENGLISH from Ucheb. Zavid. SSSR - Radioekektronika (Lithuania), v. 15, no. 5, 1972 p 641-644
(RAE-LIB-Trans-2058; BR79865) Copyright. Avail: Issuing Activity

A means for determining the spectra of modulated pulse trains using the spectral function method is explained. By this method a spectrum of signals is determined with a ChIM-2 frequency pulse modulation for a rectangular train of pulses. Author

N82-11336* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
CAVITY-BACKED, MICRO-STRIP DIPOLE ANTENNA ARRAY Patent
Haynes Ellis, Jr., inventor (to NASA) (Rockwell International Corp., Downey, Calif.) Issued 1 Sep. 1981 7 p Filed 30 Apr. 1980 Supersedes N80-24511 (18 - 15, p 1969) Sponsored by NASA
(NASA-Case-MSC-18606-1; US-Patent-4,287,518; US-Patent-Appl-SN-145206; US-Patent-Class-343-700MS; US-Patent-Class-343-708; US-Patent-Class-343-795; US-Patent-Class-343-846; US-Patent-Class-343-727) Avail: US Patent and Trademark Office CSCL 20N

A flush-mounted antenna assembly includes a generally rectangular, conductive, box structure open along one face to form a cavity. Within the cavity a pair of mutually orthogonal dielectric plane surfaces in an 'egg crate' arrangement are mounted normal to the plane of the open face, each diagonally within the cavity. Each dielectric plane supports a pair of printed circuit dipoles typically each fed from the opposite side of the dielectric plane by a printed 'cone-shaped' feed line trace which also serve as an impedance matching device and functions as a balun connected from an unbalanced strip line external feed. The open face of the conductive cavity can be flush mounted with a randome thereover, the assembly thereby being flush with the skin of a aircraft or space vehicle.
Official Gazette of the U.S. Patent and Trademark Office

N82-11337# Communications Research Centre, Ottawa (Ontario). Information Technology Branch.
DESIGN METHODOLOGY AND DEVELOPMENT HISTORY OF AN ISO OSI LAYERED ARCHITECTURE FOR THE CANADIAN BROADCAST TELIDON SYSTEM
M. Sablatash and R. Fitzgerald Aug. 1981 24 p refs
(CRC-TN-708-E) Avail: NTIS HC A02/MF A01

To enable the Telidon System to be compatible with many other data communications devices, systems and networks, a layered protocol logically and conceptually consistent with the International Organization for Standardization's (ISO's) Reference Model for Open Systems Interconnection (OSI) was designed. The features and functions of the proposed design example are described. The protocol control information for each of the seven layers is described by giving specifications for services and functions provided in each layer, and additional descriptions and definitions as required. A general methodology for the design of ISO OSI layered information systems is briefly described. J.D.H.

N82-11338*# Systems and Applied Sciences Corp., Riverdale, Md.
ANTENNA PATTERN MODIFICATION FOR SINGLE REFLECTOR ANTENNAS Final Report
A. S. Milman Jan. 1981 51 p refs
(Contract NAS5-25993)
(NASA-CR-166711) Avail: NTIS HC A04/MF A01 CSCL 20N

The problem of correcting the antenna temperatures observed with a single reflector is addressed from two viewpoints with emphasis on decreasing the level of the side lobes without greatly amplifying the noise. One viewpoint is that of matrix operations where the elements of the matrix are integrals of the antenna pattern. This formulation is directly applicable to developing algorithms. The other is that of an analysis of the problem by treating the antenna as a spatial filter and using Fourier transforms of the antenna pattern. This approach leads to an understanding of the problem, but is not suitable for performing calculations. The method developed can be used to correct data from mechanically-scanned microwave instruments that view Earth from space. A.R.H.

N82-11339*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GENERAL AVIATION AIRCRAFT ANTENNAS FOR THE GLOBAL POSITIONING SYSTEM
Melvin C. Gilreath and J. S. Chatterjee Oct. 1981 37 p refs
(NASA-TM-83212) Avail: NTIS HC A03/MF A01 CSCL 17G

Several antenna designs that utilize the NAVSTAR Global Positioning System in a low-cost system for general aviation aircraft were evaluated. Experimental investigations were made of crossed-dipoles, various types of crossed-slots, and microstrip antennas with modifications to improve their coverage. Principal plane radiation patterns for several of these antennas were measured on a one-seventh scale model of a Gates Lear Jet. R.J.F.

N82-11340*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TELECOMMUNICATIONS IN COMETARY ENVIRONMENTS
Warren L. Flock 1 Jul. 1981 43 p refs
(NASA-CR-164956; JPL-Pub-81-84) Avail: NTIS HC A03/MF A01 CSCL 17B

Propagation effects on telecommunications in a cometary environment include those due to dust, the inhomogeneous plasma of the coma and tail, and ionization generated by impact of neutral molecules and dust on the spacecraft. Attenuation caused by dust particles is estimated to be on the order of 10 to the minus 5th power dB for the Halley Intercept Mission. Ionization generated by impact on the spacecraft is estimated to result in an electron content of 10 to the 12th power to 10 to the 13th power el/sq meters (3 eV electrons) along the telecommunications path. An estimate of the electron content due to Comet Halley itself is 10 to the 16th power to 10 to the 17th power el/sq

meters, compared to a content of 10 to the 16th power to 10 to the 18th power el/sq meters for the Earth's ionosphere and 10 to the 17th power to 10 to the 18th power el/sq meters for the interplanetary medium. The electron content of the plasma near Comet Halley will cause excess range delay, and a Doppler shift of the signal from the spacecraft will occur in propagation to the rate of change of the path elrectron content. It is recommended that S and X down-link frequencies by employed to monitor the path electron content and amplitude scintillation and spectral broadening of the received signals. These measurements will provide a quantitative base of knowledge that will be valuable for radio science and telecommunications system design purposes. Author

N82-11341*# California Inst. of Tech., Pasadena.
MODULATION/DEMODULATION TECHNIQUES FOR SATELLITE COMMUNICATIONS. PART 4: APPENDICES
Jim K. Omura and Marvin K. Simon 1 Nov. 1981 94 p refs
(Contract NAS7-100)
(NASA-CR-164954; JPL-Pub-81-73) Avail: NTIS HC A05/MF A01 CSCL 17B

The use of the Viterbi algorithm in a general context is examined. The generalized transfer function bounds are given which permit the following applications to be carried out: maximum likelihood demodulation of such bandwidth modulations as minimum-shift-keying and continuous phase frequency-shift-keying, demodulation of intersymbol interference and partial response signals, estimation and smoothing, and simultaneous phase synchronization, and data detection. Sufficient conditions are reviewed for tightening Chernoff and Rhattacharyya bounds. R.J.F.

N82-11342# Harvard Univ., Cambridge, Mass.
SCATTERING OF ELECTROMAGNETIC WAVES BY OBSTACLES IN THE PRESENCE OF THE EARTH'S SURFACE Final Report, 1 Jul. 1979 - 30 Jun. 1981
Hung-Mou Lee, Tai Tsun Wu, and Ronold W. P. King 31 Aug. 1981 32 p refs
(Contract DAAG29-79-C-0109)
(AD-A104242; ARO-16297.1-EL) Avail: NTIS HC A03/MF A01 CSCL 20/14

The electromagnetic scattering from a geometrically fat tubular cylinder above a dissipative dielectric half-space has been investigated. Extensive experimental data were obtained and were found to be in agreement with theoretical results. The theory made use of an explicit analytical solution of the scattering from such a cylinder when in a single medium. Because the cylinder is a finite object with two variable geometrical parameters, it represents a very useful model for future experimental studies on the scattering from more complicated objects. Author (GRA)

N82-11343# Illinois Univ. at Urbana. Electromagnetics Lab.
STUDY OF MICROSTRIP ANTENNA ELEMENTS, ARRAYS, FEEDS, LOSSES, AND APPLICATIONS Final Technical Report
Y. T. Lo, W. F. Richards, P. S. Simon, J. E. Brewer, and C. P. Yuan Jun. 1981 86 p refs
(Contract F19628-78-C-0025; AF Proj. 2305)
(AD-A104493; UIEM-81-2; UILU-81-2539; RADC-TR-81-98) Avail: NTIS HC A05/MF A01 CSCL 09/1

Since thin microstrip antennas are inherently narrow band, it is important to have a simple means for tuning the antenna over a wide range. Based on the cavity-model theory, one can expect that the antenna could be tuned like a cavity. Some workers have demonstrated experimentally the tuning with a shorting post in the patch. It is desirable to have a theory which can predict the exact post location for a given operating frequency. To this end, our multipost theory is extended so that a simple algorithm can be applied to a wide frequency range, covering the resonant frequencies of several modes. Using this extended theory, the operating frequencies for many post locations are computed and found to agree with the measured results within a fraction of one percent. In fact, it is believed that the theory can be improved even further. It is also shown that CP can also be obtained by placing a post in a square patch. Again, the theoretical and experimental results are in almost perfect agreement. GRA

N82-11344# Rome Air Development Center, Griffiss AFB, N.Y. Propagation Branch.
EFFECT OF ENERGETIC PARTICLE EVENTS ON VLF/LF PROPAGATION PARAMETERS, 1974 - 1977
John P. Turtle, John E. Rasmussen, and Wayne I. Klemetti Oct. 1980 61 p refs
(AF Proj. 4600)
(AD-A104508; RADC-TR-80-307) Avail: NTIS HC A04/MF A01 CSCL 20/14

This report provides a summary of disturbance effects of energetic particle events on VLF/LF propagation parameters as observed by the USAF High Resolution VLF/LF Ionosounder in Northern Greenland. Disturbance effects on ionospheric reflectivity parameters, including reflection heights and coefficients, are presented along with data from a riometer, a magnetometer, and satellite particle detectors. Author (GRA)

N82-11345# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
RESEARCH ON NARROWBAND COMMUNICATIONS Quarterly Progress Report, 18 May - 17 Aug. 1981
John Makhoul, Salim Roukos, and Richard Schwartz Aug. 1981 37 p refs
(Contract F19628-80-C-0165; ARPA Order 3515)
(AD-A104296; BBN-4766; QPR-4) Avail: NTIS HC A03/MF A01 CSCL 17/2

We report on research toward a very-low-rate vocoder. This quarter we continued investigation in two areas: the phonetic vocoder and an unsupervised method for vocoding. We introduced phoneme pair probabilities to improve the accuracy of phonetic recognition. We investigated the use of the phonetic vocoder as a tool for semi-automatic labeling of speech. We also experimented with several variations of the phonetic vocoder to improve the intelligibility of the vocoded speech with a moderate increase of the bit rate. Our work in the second area concentrated on developing a novel method of spectral quantization: We quantize a sequence of spectra simultaneously. We are also evaluating a new distance metric that does not require the dynamic programming time warping. Author (GRA)

N82-11346# Naval Research Lab., Washington, D. C. Radar Analysis Branch.
ESTIMATION OF RADAR RANGE BIASES AT MULTIPLE SITES Interim Report
D. D. Prather 15 Sep. 1981 18 p refs
(XF12151104)
(AD-A104306; NRL-8510) Avail: NTIS HC A02/MF A01 CSCL 17/9

An algorithm has been developed which estimates the range bias error from measurements made by radars on two platforms within a common detection area. The radars on the platforms each measure the position of two common targets and the difference vector between the measurements. Using a number of these measurements, a least square estimate of the range bias error is determined. Author (GRA)

N82-11347# EMTEC Engineering, Inc., Berkeley, Calif.
ELECTROMAGNETIC SCATTERING BY TARGETS OVER A REAL EARTH Final Report, Apr. 1978 - Apr. 1980
Shu-Kong Chang and Kenneth K. Mei Griffiss AFB, N.Y. RADC Apr. 1981 168 p refs
(Contract F19628-78-C-0090; AF Proj. 2305)
(AD-A104492; RADC-TR-80-313) Avail: NTIS HC A09/MF A01 CSCL 17/9

The finite element method is applied to the boundary value problem of the scatterer. To account for the presence of a real Earth, multiple expansions are used to deal with the air-earth half spaces. The technique developed is applicable for metallic or dielectric targets. Computations have been made for scatterers in both free space and the presence of a real Earth. The accuracy and reliability have been checked by shifted sphere solutions, comparison with bistatic radar scattering experiments, and the reciprocity theorem. These comparisons have confirmed the validity of the method. Author (GRA)

N82-11348# Lincoln Lab., Mass. Inst. of Tech., Lexington.
PACKET SPEECH SYSTEMS TECHNOLOGY Semiannual Technical Summary Report, 1 Oct. 1980 - 31 Mar. 1981
Clifford J. Weinstein and Peter E. Blankenship 31 Mar. 1981

26 p
(Contract F19628-80-C-0002; ARPA Order 3673)
(AD-A104373; ESD-TR-81-87) Avail: NTIS
HC A03/MF A01 CSCL 17/2

The long-range objectives of the Packet Speech Systems Technology Program are to develop and demonstrate techniques for efficient digital speech communication on networks suitable for both voice and data, and to investigate and develop techniques for integrated voice and data communication in packetized networks, including wideband common-user satellite links. Specific areas of concern are: the concentration of statistically fluctuating volumes of voice traffic, the adaptation of communication strategies to varying conditions of network links and traffic volume, and the interconnection of wideband satellite networks to terrestrial systems. The current program has two major thrusts: i.e., the development and refinement of practical low-cost, robust, narrowband, and variable-rate speech algorithms and voice terminal structures; and the establishment of an experimental wideband satellite network to serve as a unique facility for the realistic investigation of voice/data networking strategies. This report covers work in the following areas: digital channel vocoder development; embedded CVSD-based speech waveform encoder design and implementation; development and experimental tests of modular packet voice terminals (PVTs) and local access area (LEXNET) facilities; development of a miniconcentrator facility to mediate the flow of traffic from the LEXNET onto the wideband satellite network, and execution of packet speech experiments using this facility; and definition and planning of, and participation in, experiments on the wideband integrated voice/data network. GRA

N82-11349# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
MULTIACCESS OF A SLOTTED CHANNEL BY FINITELY MANY USERS
Michael G. Hluckyj and Robert G. Gallager Aug. 1981 8 p refs
(Contract N00014-75-C-1183; NR Proj. 049-383)
(AD-A104417; LIDS-P-1131) Avail: NTIS HC A02/MF A01 CSCL 17/2

The multiaccess problem as characterized by a finite user population and a time-slotted channel with limited feedback is examined. Results pertaining to the relationship among commonly used performance measures are derived, and insight as to the nature of and difficulty in finding an optimal protocol is given. In addition, three restricted but reasonable classes of protocol are defined and examined. Author (GRA)

N82-11350# Effects Technology, Inc., Santa Barbara, Calif.
INVESTIGATION OF PROCEDURES FOR AUTOMATIC RESONANCE EXTRACTION FROM NOISY TRANSIENT ELECTROMAGNETICS DATA. VOLUME 1: INVESTIGATION OF RESONANCE EXTRACTION PROCEDURES Final Report, 1 Apr. 1980 - 1 Apr. 1981
Jon R. Auton and Michael L. VanBlaricum 17 Aug. 1981 98 p refs 3 Vol.
(Contract N00014-80-C-0299)
(AD-A104530; ETI-CR81-984-Vol-1) Avail: NTIS
HC A05/MF A01 CSCL 17/9

This volume presents major results and conclusions of research in resonance extraction techniques from transient electromagnetics data. Section 2 addresses the question of what the best methods of estimating the resonances for this application are. Among the estimation procedures studied are the conventional technique of using an inhomogeneous set of equations, eigenvalue decomposition techniques, Jain's method, and iterative techniques. Section 3 studies procedures for selecting the proper order and eliminating extraneous resonances. The maximum likelihood procedure for order selection is presented in Section 3. This procedure is capable of automatically determining the proper order without any prior knowledge of the noise level. Also, in Section 3, Henderson's procedure for eliminating extraneous resonances is tested by numerical example. The procedures presented in Section 3 allow an efficient, automatic procedure for order selection and resonance estimation to be constructured by using eigenvalue decomposition of the data. Section 4 discusses various practical problems that must be addressed before resonance extraction procedures for a practical radar target recognition system can be designed. GRA

N82-11351# Effects Technology, Inc., Santa Barbara, Calif.
INVESTIGATION OF PROCEDURES FOR AUTOMATIC RESONANCE EXTRACTION FROM NOISY TRANSIENT ELECTROMAGNETICS DATA. VOLUME 2: APPENDICES Final Report, 1 Apr. 1980 - 1 Apr. 1981
Jon R. Auton and Michael L. VanBlaricum 17 Aug. 1981 67 p refs 3 Vol.
(Contract N00014-80-C-0299)
(AD-A104531; ETI-CR81-984-Vol-2) Avail: NTIS
HC A04/MF A01 CSCL 17/9

This volume consists of a series of appendices whose contents could not be included in the body of Volume I without breaking the continuity. The appendices describe topics that were studied during the course of the current contract but are only tangentially related to the theme of Volume I. Several references were made in Volume I to appendices in this volume for the details of specific methods. Author (GRA)

N82-11352# Effects Technology, Inc., Santa Barbara, Calif.
INVESTIGATION OF PROCEDURES FOR AUTOMATIC RESONANCE EXTRACTION FROM NOISY TRANSIENT ELECTROMAGNETICS DATA. VOLUME 3: TRANSLATION OF PRONY'S METHOD Final Report, 1 Apr. 1980 - 1 Apr. 1981
Jon R. Auton and Michael L. VanBlaricum 17 Aug. 1981 80 p refs 3 Vol.
(Contract N00014-80-C-0299)
(AD-A104532; ETI-CR81-984-Vol-3) Avail: NTIS
HC A05/MF A01 CSCL 17/9

This document contains a bibliography of reports, papers and books that deal directly with Prony's method. Section 2.0 of this volume contains a translation from the French of Prony's original paper. Author (GRA)

N82-11353# Naval Postgraduate School, Monterey, Calif.
FOURIER ANALYSIS OF BROADBAND, LOW-LEVEL SIGNALS USING SWITCHED INPUTS M.S. Thesis
Gary L. Howarth Jun. 1981 79 p refs
(AD-A104588) Avail: NTIS HC A05/MF A01 CSCL 09/3

A new technique for estimation of the spectrum of an unknown signal is investigated. The technique combines a radiometric method of signal detection (modulating the receiver noise with the assumed signal by alternately connecting and disconnecting the input transducer) with a Fast Fourier Transform processor for spectral analysis. After obtaining averaged spectral estimates with the transducer (antenna) connected and disconnected, the difference is formed and statistical analyses applied to determine statistically significant terms. The significant components comprise the estimate of the spectrum of the signal. Analytical results are derived for sinusoidal signals and uncorrelated, Gaussian noise. Experimental results for both narrow and wideband signals and additive Gaussian noise are presented. Reasonable spectral estimates of a wideband signal are obtained with 16 averages when the composite signal-to-noise ratio is 0 dB. Author (GRA)

N82-11354# Edgerton, Germeshausen and Grier, Inc., Albuquerque, N. Mex.
SYSTEM SAFETY PROGRAM PLAN Final Report, 31 Mar. - 8 Aug. 180
A. J. Bonham 8 Aug. 1980 79 p refs
(Contract DNA001-80-C-0177)
(AD-A104557; AG-1446; DNA-5467F) Avail: NTIS
HC A05/MF A01 CSCL 12/12

This document, System Safety Program Plan, is the implementing document covering the safety aspects of performing an EMP Test on the A7E aircraft in the HPD (Horizontally Polarized Dipole), VPD (Vertically Polarized Dipole), and NWEF hangar facilities at Kirtland AFB, New Mexico. GRA

N82-11355# Sandia Labs., Livermore, Calif.
MICROCOMPUTER-CONTROLLED COMMUNICATION NETWORK FOR SANDIA NATIONAL LABORATORIES' ENVIRONMENTAL TEST CHAMBERS
L. C. Bennett Aug. 1981 15 p refs
(Contract DE-AC04-76DP-00789)

(DE81-030988; SAND-81-1782) Avail: NTIS HC A02/MF A01

A microcomputer-controlled communication system that links together in a network four data-acquisition computers and four low-level signal scanner/amplifiers is described. The scanner/amplifiers monitor transducers that are connected to specimens within environmental test chambers located in the high-bay area of Sandia's Building 860. The microcomputer hardware and its controlling program are described. DOE

N82-11356# National Telecommunications and Information Administration, Washington, D.C.

USER'S GUIDE: VOICE AND DATA COMMUNICATIONS PROTECTION

Roger Neighborgall and Robert Massey May 1981 155 p (PB81-221509; NTIA-CR-80-9) Avail: NTIS HC A08/MF A01 CSCL 17B

Powerful, low cost computers, combined with increasingly sophisticated telecommunications systems, have created an environment in which voice and a communications transmissions are becoming more susceptible to unauthorized interception. Protection devices and terminals, with a variety of operational features, and principles, are described for the benefit of government telecommunications managers. The vendors offering 160 products are identified. Protection systems are explained, and an extensive glossary and bibliography are included. GRA

N82-11282*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DSN GROUND COMMUNICATION FACILITY

R. H. Evans *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 9-18 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

N82-11286*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

STRATEGIES FOR WEATHER-DEPENDENT DATA ACQUISITION

E. C. Posner *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 34-46 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11287*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

VIRTUAL CENTER ARRAYING

L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* the Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 47-52 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11290*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RFI CHANNELS, 2

R. J. McEliece *In its* The Telecommun. and Data Acquisitions Rept. 15 Oct. 1981 p 75-80 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11291*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE R SUB 0 PARAMETER FOR THE GAUSSIAN CHANNEL

R. J. McEliece and E. R. Rodemich *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 81-85 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17B

N82-11292*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DESIGN OF THROAT SECTION OF CONICAL CORRUGATED HORNS

A. D. Olver *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 86-93 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

N82-11295*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DIGITAL SAR PROCESSING USING A FAST POLYNOMIAL TRANSFORM

S. Butman, R. Lipes, A. Rubin, and T. K. Truong *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 104-112 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

N82-11298*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

REMOVAL OF DRIFT FROM FREQUENCY STABILITY MEASUREMENTS

C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 127-132 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20N

N82-11308*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GOLDSTONE HIGH POWER RADIATION CONTROL

B. A. Gaudian and R. B. Cushman (Bendix Field Engineering Corp.) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 197-204 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20I

N82-11309*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

PLANETARY RADAR

R. D. Shaffer, J. T. McCluskey, and G. S. Downs *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 205 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 17I

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-11357* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

LOW TEMPERATURE LATCHING SOLENOID Patent

William S. Wang, inventor (to NASA) (Consolidated Controls Corp., El Segundo, Calif.) Issued 13 Oct. 1981 8 p Filed 29 Nov. 1979 Supersedes N80-14338 (18 - 05, p 0597) Sponsored by NASA
(NASA-Case-MSC-18106-1; US-Patent-4,295,111; US-Patent-Appl-SN-098568; US-Patent-Class-335-256; US-Patent-Class-335-266; US-Patent-Class-361-141) Avail: US Patent and Trademark Office CSCL 09A

A magnetically latching solenoid includes a pull-in coil and a delatching coil. Each of the coils is constructed with a combination of wire materials, including material of low temperature coefficient of resistivity to enable the solenoid to be operated at cryogenic temperatures while maintaining sufficient coil resistance. An armature is spring-based toward a first position, that may extend beyond the field of force of a permanent magnet. When voltage is temporarily applied across the pull-in magnet, the induced electromagnetic forces overcome the spring force and pulls the armature to a second position within the field of the permanent magnet, which laches the armature in the pulled-in position. Application of voltage across the delatching coil induces electromagnetic force which at least partially temporarily nullifies the field of the permanent magnet at the armature, thereby delatching the armature and allowing the spring to move the armature to the first position.

Official Gazette of the U.S. Patent and Trademark Office

N82-11358# National Aerospace Lab., Tokyo (Japan).

APPLICATION OF A RARE-EARTH COBALT MAGNET TO

SYNCHRONOUS MOTORS
Hiroshi Yamada 1981 11 p refs In JAPANESE; ENGLISH summary
(NAL-TR-656; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

An experimental hysteresis rotor structure was produced in which a ring made of radially oriented anisotropic magnet material, Alnico 5 which has a large magnetic hysteresis loop, and a yoke made of inner steel are utilized. The prototype hysteresis motor has a large ratio of output power to magnet volume and a large starting torque as compared with conventional hysteresis motors. The structure, torque analysis, torque characteristics and equivalent circuit of the synchronous condition of the prototype synchronous motors are discussed. A comparison of the hysteresis and the permanent-magnet-type synchronous motor is also given. B.W.

N82-11359*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOW NOISE TUNED AMPLIFIER Patent Application
Leonard Klienberg, inventor (to NASA) Filed 12 Jun. 1981 15 p
(NASA-Case-GSC-12567-1; US-Patent-Appl-SN-272839) Avail: NTIS HC A02/MF A01 CSCL 09A

A bandpass amplifier first stage with a resistive load either a.c. or directly coupled to the non-inverting input of an operational amplifier second stage which is loaded in a Wien Bridge configuration. The bandpass amplifier may be operated with a signal injected into the gate terminal of the field effect transistor and the signal output taken from the output terminal of the operational amplifier. The operational amplifier stage appears as an inductive reactance, capacitive reactance and negative resistance at the non-inverting input of the operatinal amplifier, all of which appear in parallel with the resistive load of the field effect transistor. NASA

N82-11360*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MOTOR POWER FACTOR CONTROLLER WITH A REDUCED VOLTAGE STARTER Patent Application
Frank J. Nola, inventor (to NASA) Filed 13 Oct. 1981 17 p
(NASA-Case-MFS-25586-1; US-Patent-Appl-SN-310714) Avail: NTIS HC A02/MF A01 CSCL 09A

A power factor type motor controller is disclosed in which the conventional power factor constant voltage command signal is replaced during a starting interval with a graduated control voltage. This continuation-inpart of a pending patent application (Serial No. 199, 765: Three Phase Factor Controller) provides a means for modifying the operation of the system for a motor start-up interval of 5 to 30 second. Using a ramp generators, an initial ramp-like signal replaces a constant power factor signal supplied by a potentiometer. The ramp-like signal is applied to a 15 terminal where it is summed with an operating power factor signal from phase detectors in order to obtain a control signal for ultimately controlling SCR devices. The SCR devices are turned on at an advancing rate with time responsive to the combination signal described rather than simply a function of a ramp-like signal alone. NASA

N82-11361# California Univ., Berkeley. Dept. of Physics.
LARGE GAIN, NEGATIVE RESISTANCE, AND OSCILLATIONS IN SUPERCONDUCTING QUASIPARTICLE HETERODYNE MIXERS
W. R. McGrath, P. L. Richards, A. D. Smith, H. Van Kempen, R. A. Batchelor, D. Prober, and P. Santhanam 1981 14 p refs Prepared in cooperation with Yale Univ., New Haven Sponsored in part by Netherlands Organization for the Advancement of Pure Research
(Contract N00014-75-C-0496)
(AD-A104534) Avail: NTIS HC A02/MF A01 CSCL 09/5

We have measured the properties of a superconductor-insulator-superconductor (SIS) quasiparticle mixer which is operated in the quantum limit. Single sideband conversion gain larger than +4 dB was observed at 36 GHz with a mixer noise temperature T=9 + or - 6K, which is to be compared with the (Planck) quantum limit h-bar omega/(kln2) approx. 2.5K. Complete 3-port mixer calculations are presented which are in good agreement with the gain measurements. Negative resistance was observed which implies that arbitrarily large gain is available. GRA

N82-11362# Rome Air Development Center, Griffiss AFB, N.Y.
A COMPARISON OF WEIGHTING TECHNIQUES FOR SAW TRANSDUCERS AT UHF Report, May 1976 - Jan. 1981
A. J. Slobodnik, Jr., T. L. Szabo, E. Cohen, G. A. Roberts, and J. H. Silva Mar. 1981 19 p refs
(AF Proj. 2305)
(AD-A104510; RADC-TR-81-30) Avail: NTIS HC A02/MF A01 CSCL 09/5

A comparison is made of several constant-finger-overlap, interdigital transducer-weighting schemes for realizing low sidelobe, SAW, bandpass filters between 330 and 340 MHz. Withdrawal weighting yields slightly superior performance, but source weighting allows simpler design procedures. The neglect of near-neighbor interactions (all 1's design) yields relatively poor results. Source-weighting tables are provided in an Appendix. Author (GRA)

N82-11363# Texas Instruments, Inc., Dallas. System Components Lab.
BINARY/ANALOG CCD CORRELATOR DEVELOPMENT Final Technical Report, 1 Aug. 1978 - 31 Dec. 1980
R. A. Haken Jul. 1981 62 p refs
(Contract F19628-78-C-0122; AF Proj. 4600)
(AD-A104438; TI-08-79-10; RADC-TR-81-168) Avail: NTIS HC A04/MF A01 CSCL 09/5

The architecture, design and performance of a general purpose, 1,024-stage, programmable transversal filter implemented in CCD/NMOS technology is described. The device features programmability of the reference signal, the filter length and weighting coefficient resolution. Off-ship circuitry is minimized by incorporating both analog and digital support circuitry, on-chip. This results in a monolithic analog signal processing system that has the flexibility to be operated in nine programmable configurations, from 1,024-stages by 1-bit, to 128-stages by 8-bits. The versatility of the device makes it suitable for a wide range of applications, from matched filtering with chirp signals and very long binary sequences, to image correlation and adaptive filtering. Author (GRA)

N82-11364# Texas Research Inst., Inc., Austin.
INVESTIGATION OF THE STRENGTH OF SHIELDED AND UNSHIELDED UNDERWATER ELECTRICAL CABLES Final Report
D. E. Glowe and S. L. Arnett Washington NRL 16 Sep. 1981 35 p refs
(Contract N00173-79-C-0129)
(AD-A104314; Rept-7967-15-Deg; NRL-MR-4468) Avail: NTIS HC A03/MF A01 CSCL 09/1

The mechanical properties of shielded and unshielded submarine cables (MIL-C-915/8E) were investigated to determine the effect of shielding on cable life, performance, and reliability. Ten cables (five shielded and five unshielded) were selected for laboratory evaluation. A mission profile was developed to establish the mechanical stress limits that cables must endure in service and a test sequence designed to measure tensile strength, flexural abrasion endurance, crush resistance, creep under static tension, and performance in a hull-stuffing tube. The results of this program showed that: (1) DSS-2 cable does not have adequate tensile strength and should have a strength member added. DSS-3 and larger cables have adequate tensile strength with or without the shield; (2) Unshielded DSS-3 type cable does not perform satisfactorily in hull-stuffing tubes; (3) Shielding is not required to meet mission profile specifications for cable crush or flexural abrasion resistance; (4) Construction parameters other than shielding can significantly affect mechanical performance of cable; (5) Unshielded cable construction can result in increased reliability since it permits a thicker single-jacket construction; and (6) Unshielded cable construction can reduce the cost of cable by 8 to 20 percent. Author (GRA)

N82-11365# Honeywell, Inc., Clearwater, Fla. Avionics Div.
MANUFACTURING METHODS AND TECHNOLOGY ENGINEERING FOR TAPE CHIP CARRIER Final Report, 30 Jun. 1977 - 31 Aug. 1981
William R. RodriguesdeMiranda, Wilford O. Perry, and Paul H.

Shreve Aug. 1981 130 p
(Contract DAAB07-77-C-0526)
(AD-A104393; DELET-TR-77-0526F) Avail: NTIS HC A07/MF A01 CSCL 09/5

This contract was aimed at establishing the feasibility of an assembly line for manufacturing hybrid microcircuits using tape automated bonding (TAB). This report describes work performed during the pilot line phase of the contract. A purpose of the MM&T work was to demonstrate the viability of the manufacturing approaches with TAB and the determination of the associated yield and cost factors. This report includes an overview of these factors, the methods and equipment employed in the manufacture of approximately 1200 hybrid microcircuits with TAB, and the qualification test results of the circuits using the TAB mounted devices. Author (GRA)

N82-11366# Centre National de la Recherche Scientifique, Besancon (France).
LOW TEMPERATURE QUARTZ CRYSTAL OSCILLATOR FAST WARM-UP SAW OSCILLATOR Interim Report, 1 Feb. 1980 - 31 Jan. 1981
J. J. Gagnepain and D. Hauden Griffiss AFB, N.Y. RADC Jul. 1981 40 p refs
(Grant AF-AFOSR-0105-80; AF Proj. 2305)
(AD-A104403; RADC-TR-81-184) Avail: NTIS HC A03/MF A01 CSCL 14/2

The objectives of this program are to: evaluate the frequency instabilities of quartz crystal resonators as a function of temperature and Q-factors; show the feasibility of low temperature quartz oscillators; and determine the dynamic thermal behavior of SAW quartz oscillators and precise crystal orientation and wave propagation direction with minimized sensitivities. The measurements of the frequency noise of different quartz resonators at room temperature show a correlation between 1/f noise levels and Q-factors, following 1/Q to the 4th power law. This new property was confirmed by measuring the 1/f noise level of a pair of resonators at 300 K, 4.2 K and 1 K. A first theoretical study enables to explain the 1/Q to the 4th power law from the phonon-phonon interactions due to the crystal anharmonicities. Under fast temperature variations frequency shifts are observed in SAW delay lines, which are proportional to the time derivative of the temperature. This dynamic thermal behavior was evaluated for ST cut quartz and found comparable to that one of AT-cut quartz BAW resonators. Therefore such a thermal sensitivity is not admissible for fast warm-up oscillator applications and must be lowered. Author (GRA)

N82-11367# Texas Instruments, Inc., Dallas. Semiconductor Group.
R&D SERVICES TO DEVELOP AN IMPROVED ISOLATION TECHNOLOGY RADIATION HARDENED BIPOLAR INTEGRATED CIRCUITS (PEDIC) Final Technical Report, Aug. 1978 - May 1980
Edward N. Jeffrey Jun. 1981 21 p
(Contract F19628-78-C-0205; AF Proj. 4600)
(AD-A104657; TI-03-80-47; RADC-TR-81-66) Avail: NTIS HC A02/MF A01 CSCL 18/6

This report describes work performed in the development of a dielectrically isolated integrated circuit process for fabricating radiation hardened integrated circuits. The improved process, called PEDIC (Post Epitaxial Dielectrically Isolated Circuits), provides advantages over standard DI processes: radiation tolerant improvements, lower cost, faster turnaround time, better electrical performance, and greater packing density. Electrical test data from a 2-input NAND gate circuit fabricated in the PEDIC structure is also given. Author (GRA)

N82-11368# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
INVESTIGATION OF THE ZINC ELECTRODE REACTION Annual Report, 1 Oct. 1979 - 30 Sep. 1980
James McBreen Dec. 1980 138 p refs
(Contract DE-AC02-76CH-00016)
(DE81-030221; BNL-51370) Avail: NTIS HC A07/MF A01

In nickel-zinc batteries, with pasted zinc electrodes, zinc electrode shape change or redistribution of the active material from the edge of the electrodes toward the center is the major life-limiting factor. In batteries with soluble free electrolyte zinc electrodes, morphology changes, particularly under random cycling conditions, is a major operational problem. Insights and possible solutions to these two problems are considered. The areas covered include: (1) additive and substrate effects on zinc electrode morphology; (2) investigations of zinc electrodes of the second kind; (3) separator effects on zinc electrode shape change; and (4) investigation of the effect of modified charging methods on the morphology and behavior of both pasted and soluble free electrolyte zinc electrodes. DOE

N82-11369# Auburn Univ., Ala. Engineering Experiment Station.
CONDUCTOR FATIGUE-LIFE RESEARCH Final Report
G. E. Ramey Jul. 1981 142 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 1278-1)
(DE81-904209; EPRI-EL-1946) Avail: NTIS HC A07/MF A01

The effects of reducing vibration amplitudes of conductors which had been minimally damaged by aeolian vibration were investigated. Conductors were vibrated at high amplitudes until a predetermined number of strand breaks occurred, after which the vibration was continued at reduced amplitudes. Three different conductors were tested: 795 KCM 26/7, 795 KCM 45/7, and 397.5 KCM 26/7. Two different amplitude reductions were used to establish a threshold value for a maximum reduced amplitude. The amplitude reduction values were determined and conductor sizes and strandings tested. For each set of parameters, four duplicative tests were performed to give statistical credence to the data. The results of the investigation indicated that amplitude reductions arrested fatigue strand breakage in each case. DOE

N82-11370# Sandia Labs., Albuquerque, N. Mex.
HIGH-VOLTAGE AIR-CORE PULSE TRANSFORMERS
G. J. Rohwein Aug. 1981 34 p refs
(Contract DE-AC04-76DP-00789)
(DE81-030999; SAND-80-0451) Avail: NTIS HC A03/MF A01

Air core pulse transformers are best suited to applications outside the normal ranges of conventional magnetic core transformers. In general these include charge transfer at high power levels and fast pulse generation with comparatively low energy. When properly designed and constructed, they are capable of delivering high energy transfer efficiency and have demonstrated superior high voltage endurance. The general types designed for high voltage pulse generation and energy transfer applications are described. Special emphasis is given to pulse charging systems which operate up to the multi-megavolt range. DOE

N82-11371# Brookhaven National Lab., Upton, N. Y.
TEST RESULTS OF ac SUPERCONDUCTING CABLES
E. B. Forsyth 1981 8 p refs Presented at the IEEE/PES Conf., Minneapolis, 20-25 Sep. 1981
(Contract DE-AC02-76CH-00016)
(BNL-29291; CONF-810903-1) Avail: NTIS HC A02/MF A01

Results of testing ac superconducting cables during the development stages are given. A test facility designed to demonstrate and evaluate cables rated for 138 kV, 1000-MVA 3-phi service is described. Most of the equipment has been installed and tested; results are presented. DOE

N82-11372# Ames Lab., Iowa.
SUPERCONDUCTING PROXIMITY EFFECT FOR IN SITU AND MODEL LAYERED SYSTEMS
D. K. Finnemore 1980 19 p refs Presented at the NATO Advanced Study Inst. Superconducting Mater.-Sci. and Technol. Conf., Lisbon, 19 Aug. 1980 Submitted for publication
(Contract W-7405-eng-82)
(DE81-025530; IS-M-297; CONF-800839-2) Avail: NTIS HC A02/MF A01

The primary drawback for in situ composites is that the ac losses are higher than for mechanically produced multifilamentary wire. To develop an understanding of the proximity effect so that analytical expressions will be available for design, a model system is developed based on PbCd. Items discussed include boundary conditions at SN interface, phonon spectral function,

supercurrents through normal barriers, flux entry fields, and implications for in situ composites. DOE

N82-11373# Los Alamos Scientific Lab., N. Mex.
ENERGY LOSSES IN CONDUCTORS CARRYING VERY HIGH CURRENTS
Sidney Singer and Robert O. Hunter (Western Research Corp.) 1981 8 p Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025367; LA-UR-81-1928; CONF-810659-13) Avail: NTIS HC A02/MF A01

Losses of an electromagnetic and a shock compression nature were investigated. In experiments where electrical energy must be converged from a large pulsed power supply to a small load, these losses can account for half the original energy and limit the magnitude of the energy per unit volume in the load. These considerations may be important for the study of material properties at high energy density. DOE

N82-11374# California Univ., Livermore. Lawrence Livermore Lab.
PERFORMANCE OF A 100-kV, 78kJ ELECTRIC-GUN SYSTEM
H. Chau, G. Dittbenner, K. Mikkelsen, R. Weingart, K. Froschner (Martin, Froeschner and Associates), and R. Lee (Kansas State Univ., Manhattan) 15 Jun. 1981 7 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract W-7405-eng-48)
(DE81-025603; UCRL-86259; CONF-810684-24) Avail: NTIS HC A02/MF A01

An electric gun system was constructed for use in high-pressure equation of state studies. The system is powered by a 100 kV, 15.6 micron F capacitor bank. At 100 kV charging voltage the system inductance is 23 nH. This system has driven 0.3 mm-thick Kapton projectiles to > 20 km/s and 0.3 mm Kapton/30 micrometer Ta projectiles to approximately 10 km/s. Projectile velocity is modeled phenomenlogically by an electrical Gurney model. DOE

N82-11375# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Metallurgy and Materials Science.
EXPERIMENTS IN HIGH VOLTAGE ELECTRON MICROSCOPY Progress Report, 31 Oct. 1980 - Jun. 1981
T. E. Mitchell, L. W. Hobbs, T. Mukai, H. Liu, M. Pascucci, and R. A. Youngman Jun. 1981 25 p refs
(Contract DE-AS02-76ER-02119)
(DE81-025574; DOE/ER-02119/24; COO-2119-24) Avail: NTIS HC A02/MF A01

The direct observation of radiation damage in metals and ceramics using high voltage electron microscopy (HVEM) is described. The electron irradiation capabilities of the HVEM and its increased penetration capabilities are explored. Radiation induced segregation and phase instability, disordering, and secondary defect formation in various alloys was investigated. The response of ceramics to irradiation is categorized through the formation of stoichiometric defects, decomposition or precipitation of a second phase, and transition from the crystalline to the amorphous state. DOE

N82-11376# Department of Energy, Washington, D. C.
ELECTRIC POWER SUPPLY AND DEMAND FOR THE CONTIGUOUS UNITED STATES, 1981 - 1990
Jul. 1981 584 p refs
(DE81-027126; DOE/EP-0022) Avail: NTIS HC A25/MF A01

The outlook for electric power supply and demand in the United States decade 1981 to 1990 is reviewed from the perspective of reliability and adequacy of service. Electric power supply adequacy as projected for the nine Regional Reliability Council areas of the contiguous United States is reported as well as interruptible load data reported by the Councils. Coeneration is discussed. Each of the 27 electric regions (sub-areas of the nine Council areas) in the contiguous US are studied. A glossary of terms is given. Appendices describe the Council structure, and include a copy of the ERA-411 Manual, which contains all the items to which the Councils were asked to respond. The utilities with included data, the Staff Report, Estimated Electric Demand and Supply for Summer 1981, Contiguous United States dated May 1981 are included. DOE

N82-11377# Sandia Labs., Albuquerque, N. Mex.
MODELING AND ELIMINATION OF LATCH-UP IN BULK CMOS INTEGRATED CIRCUITS
A. Ochoa, Jr. and P. V. Dressendorfer 1981 3 p refs Presented at Symp. on VLSI Technol., Maui, Hawaii, 9 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DE81-017413; SAND-81-1087C; CONF-810908-1) Avail: NTIS HC A02/MF A01

Bulk CMOS ICs continues to be a competitive technology in the VLSI era of microelectronics, but may suffer from the problem of four-layer SCR paths which can become activated causing latch-up of the part. The fundamental understanding of this phenomenon is improved by analyzing the various modes of latch-up, the effects of contact and spreading resistance, and other distributed effects. Design and process solutions for the prevention of latch-up in VLSI structures are discussed. DOE

N82-11378# California Univ., Livermore. Lawrence Livermore Lab.
TESTING AND OPTIMIZING ACTIVE ROTARY FLUX COMPRESSORS
B. M. Carder, D. Eimerl, E. J. Goodwin, J. Trenholme, R. J. Foley, and W. L. Bird (Texas Univ., Austin) 1 Jun. 1981 5 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981
(Contract W-7405-eng-48)
(DE81-024376; UCRL-85760; CONF-810659-20) Avail: NTIS HC A02/MF A01

The test program for iron wave-wound, rotary flux compressor (ARFC: is described. Peak-current to startup-current ratios of 17 were produced with a rotor tip speed of 60 meters per second. Submillisecond pulse widths were also measured: the minimum, 590 microseconds was obtained at 5607 rpm with an 8-inch diameter, 4-pole rotor. The machine was operated without a high current output switch, proving the feasibility of a novel commutation scheme. A computational code was developed that calcultes the output waveshape of the model ARFC with reasonable accuracy. A second optimization code selects the best design for a given application. This code shows favorable cost effectiveness of large ARFC's over the conventional capacitors to driven flashlamps for large lasers. DOE

N82-11379# Air Force Weapons Lab., Kirtland AFB, N. Mex.
HIGH ENERGY DENSITY CAPACITOR TESTING FOR THE AFWL SHIVA
D. L. Smith and R. E. Reinovsky 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-023688; SAND-81-0617C; CONF-810659-18) Avail: NTIS HC A02/MF A01

Lifetime testing and analysis of small samples of high energy density (HED) discharge capacitors at the AFWL were conducted to find a component suitable for upgrading the SHIVA capacitor bank to a 6 MJ facility. Evaluation was performed with discharge conditions of approximately 250 kA per capacitor at 60 to 70% reversal and < 2 microsec quarter period. Dielectric systems including Kraft paper with caster oil impregnant and Kraft paper, polypropylene with DiOctyl Phthalate (DOP) impregnant were tested. DOE

N82-11380# Cherrywood Farms, Williamsburg, Mich.
PROJECT DEMONSTRATION OF WIND-TURBINE ELECTRICITY: INTERCONNECTING A NORTHERN MICHIGAN FRUIT FARM WITH A MAJOR UTILITY Interim Report, 2 Sep. 1980 - 27 Apr. 1981
David M. Amon 1981 86 p
(Contract DE-FG02-80R5-10226)
(DE81-030950; DOE/R5-10226/1) Avail: NTIS HC A05/MF A01

Progress is reviewed in a project to test the economic feasibility of wind turbine technology for generating electricity. The use of wind genrated electricity on a commercial fruit farm

interconnecting a commercial fruit farm with a major utility to sell power are the find project goals. DOE

N82-11381# Westinghouse Research and Development Center, Pittsburgh, Pa.
ACOUSTIC WAVEGUIDE TECHNIQUE FOR SENSING INCIPIENT FAULTS IN UNDERGROUND POWER-TRANSMISSION CABLES: INCLUDING ACOUSTO-OPTIC TECHNIQUES Final Report
R. T. Harrold Sep. 1981 66 p refs
(Contracts DE-AC01-78ET-29335; ET-78-C-01-2867)
(DE81-029626; DOE/ET-29335/T1) Avail: NTIS HC A04/MF A01

Theoretical and practical studies were made of both the acoustic emission, spectrum signatures associated with underground cable incipient faults, and the attenuation of acoustic waves in waterfilled metal tubes used as waveguided. Based on critical data, it can be estimated that in favorable circumstances, the acoustic waveguide system would only be useful for sensing incipient faults in underground cables of approx. 800 meters of less in length. A system were investigated which acoustic emissions from cable incipient faults impinge on a fiber-optic lightguide and locally change its refractive index and modulate laser light transmitted along the light guide. Experiments based on this concept show that is is possible t sense acoustic emissions with energy levels below on micro-joule. A test of this system using a section of compressed gas-insulated cable with an internal flashover was successfully carried out. DOE

N82-11382# Pacific Gas and Electric Co., San Ramon, Calif.
RESEARCH TO DEVELOP GUIDELINES FOR CATHODIC PROTECTION OF CONCENTRIC NEUTRAL CABLES, VOLUME 1 Interim Report
J. A. Hanck and G. Nekoksa Aug. 1981 164 p refs Sponsored by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 1049-1)
(DE81-904195; EPRI-EL-1970-Vol-1) Avail: NTIS HC A08/MF A01

Data associated with corrosion of concentric neutrals (CN) of direct buried cables from field tests conducted at 36 bellholes excavated in California, Oklahoma, and North Carolina are presented. The electrochemical, chemical, bacteriological, and sieve analyses of native soil and imported backfill samples are included. Up to 129 values were determined for each bellhole and stored on cards as a data bank. All values were statistically analyzed and correlated with corrosion found. The severity of corrosion correlated best with CN corrosion potentials, CN resistance measurements, coarseness of backfill, and soil resistivity. The guidelines for installation of cathodic protection on CN cables are to be based upon the evaluation of over 100 experimental cathodic protection systems and upon laboratory testing for protection criteria with and without ac effects. DOE

N82-11383# Pacific Gas and Electric Co., San Ramon, Calif.
RESEARCH TO DEVELOP GUIDELINES FOR CATHODIC PROTECTION OF CONCENTRIC NEUTRAL CABLES, VOLUME 2 Interim Report
J. A. Hanck and G. Nekoksa Aug. 1981 278 p Sponsored by Electric Power Research Inst. 2 Vol.
(EPRI Proj. 1049-1)
(DE81-904210; EPRI-EL-1970-Vol-2) Avail: NTIS HC A13/MF A01

Data from field tests and sieve analyses presented in support of an effort to develop guidelines for the installation of underground transmission primary calbes. Anodic and cathodic polarization curves and the surface and cable potential gradients from 38 bellholes. A.R.H.

N82-11384# National Bureau of Standards, Washington, D.C. National Engineering Lab.
SEMICONDUCTOR MEASUREMENT TECHNOLOGY ARPA/NBS WORKSHOP MOISTURE MEASUREMENT TECHNOLOGY FOR HERMETIC SEMICONDUCTOR DEVICES Final Report
Harry A. Shafft, ed., Stanley Ruthber, ed., and Elaine C. Cohen, ed. May 1981 206 p refs Workshop held at Gaithersburg, Md., 22-23 Mar. 1978 Sponsored in part by DARPA
(PB81-220733; NBS-SP-400-69) Avail: NTIS HC A10/MF A01 CSCL 09A

Measurement problems in integrated circuit processing and assembly served as a forum to examine present problems with the measurement of moisture in hermetic semiconductor devices. Manuscripts and summaries are provided of 19 talks, panel meetings, and group encounters on three major topics: mass spectrometer measurements of internal package moisture, moisture sensors, and package analysis and quality assurance. GRA

N82-11293*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CRYOGENIC FILTERS FOR RFI PROTECTION
J. J. Bautista and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 94-98 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

N82-11300*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SURFACE RESISTIVITY MEASUREMENTS OF CANDIDATE SUBREFLECTOR SURFACES
E. H. Thom and T. Y. Otoshi *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 142-150 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09C

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-11385 California Univ., Los Angeles.
NON-LINEAR EVOLUTION OF AN OBLIQUELY PROPAGATING LANGMUIR WAVE Ph.D. Thesis
Curtis Robert Menyuk 1981 173 p
Avail: Univ. Microfilms Order No. 8121008

In the transition regime between regular and stochastic motion, the electron orbits are complicated and an analytic solution does not appear possible. The asymptotic total damping of the wave is determined using two different approaches. The two methods lead to asymptotic amplitudes which agree to within a factor of two, and the wave's total damping is found to increase significantly when a transition is made between the regular and stochastic regimes, i.e., when resonances overlap. The amplitude oscillations in the trapping regime disappear due to superphase mixing of the many bounce frequencies when the angle of propagation is increased past 14 deg. Dissert. Abstr.

N82-11386 Cornell Univ., Ithaca, N. Y.
THEORETICAL INVESTIGATION OF A PASSIVE SCALAR SUCH AS TEMPERATURE IN ISOTROPIC TURBULENCE Ph.D. Thesis
Robert McDougall Kerr 1981 142 p
Avail: Univ. Microfilms Order No. 8119528

The statistical properties of an isotropic scalar field in turbulence were investigated. It is demonstrated that the decay rate of temperature fluctuation depends on the initial temperature scale size. A simple dynamic model of the spectrum and phenomenological arguments are used to resolve these problems. We show that the observed dependence on initial scale size is in fact a transient and derive a formula which describes the crossover to asymptotic scalar decay. A three dimensional spectral code for the velocity and passive scalar are presented and used to calculate the higher order statistics which describe intermittency. Decaying turbulence at very low Reynolds numbers is investigated. The rapid decay rates observed are determined to be due to the absence of an inertial range at low Reynolds numbers. The way a coherent, anisotropic scalar field returns to isotropy is analyzed. Dissert. Abstr.

N82-11387 California Univ., Los Angeles.
THREE-DIMENSIONAL LEE WAVES IN A CONTINUOUSLY STRATIFIED FLUID Ph.D. Thesis
Robert Dale Sharman 1981 172 p
Avail: Univ. Microfilms Order No. 8121054

A stably stratified fluid flowing over an isolated obstacle produces waves in the lee which have many of the characteristics of ship waves in water of finite depth. Use of a model in which the mean wind increases exponentially with height minimizes the considerable mathematical difficulties involved and allows for approximate analytic solutions for the far field three dimensional trapped lee wave pattern. It is shown that the character of the wave pattern depends on the surface Richardson number. A large number of modes is excited in every case and the analysis breaks down for the higher modes. To determine wave amplitudes then, recourse had to be made to numerical simulations using a transient gravity wave model. Several simulations were carried out for different values of the Richardson number and the results support the analysis. Dissert. Abstr.

N82-11388 California Univ., Los Angeles.
SHEAR FLOW INSTABILITIES IN A ROTATING SYSTEM Ph.D. Thesis
Wei-Lee Chen 1981 176 p
Avail: Univ. Microfilms Order No. 8120930

Instabilities of viscous shear flows in a fluid layer rotating about a vertical axis were investigated. Two basic states were considered: (1) a baroclinic linear shear flow, which is associated with an imposed horizontal temperature gradient, and (2) double Ekman layers, which are produced by the relative motion of the two horizontal boundaries. Two instability mechanisms are present in this system, the inflection point mode and the symmetric mode. The linear theory of these instabilities is considered in the case baroclinic flow and Ekman layer flow. A Runge-Kutta shooting method was used in the numerical analysis. In special cases the nonlinear properties of the instabilites were studied. Finite amplitude disturbances in the form of rolls were investigated using the Galerkin technique. It was found that the existence of multiple solutions is a common feature. Moreover, finite amplitude disturbances can exist at Reynolds numbers lower than that predicted by the linear analysis. To test whether the finite amplitude rolls are realized, a stability analysis of the combined circulation was also performed. Dissert. Abstr.

N82-11389 Royal Aircraft Establishment, Bedford (England). Library.
SOME PROBLEMS IN THE CALCULATION OF FLOWS WITH TANGENTIAL DISCONTINUITIES
V. F. Molchanov Nov. 1980 17 p refs Transl. into ENGLISH from Uch. Zap. TsAGI (USSR), v. 6, no. 4, 1975 p 1-11
(RAE-LIB-Trans-2059; BR77975) Copyright. Avail: Issuing Activity

A scheme of a method of discrete vortices, applicable in calculations of plane flows with tangential discontinuities was investigated. It is shown that the dispersion of vortices usually found in calculations is the effect of the incorrect nature of the problem on the multitude of growing perturbations, and of the instability of the difference scheme on the multitude of decreasing perturbations. On the basis of the application of the theory of the solution of incorrectly set problems and of the theory of difference schemes, a method is developed which potentially offers the possibility of carrying out calculations with a given degree of accuracy. Results are illustrated taking the case, by way of example, of the calculation of the nonlinear characteristics of a rectangular wing of small aspect ratio. Author

N82-11390*# SHD Associates, Inc., Evanston, Ill.
SURFACE-TENSION INDUCED INSTABILITIES: EFFECTS OF LATERAL BOUNDARIES Final Report
S. Rosenblat, S. H. Davis, and G. M. Hornsy Jun. 1981 130 p refs
(Contract NAS3-22274)
(NASA-CR-165530) Avail: NTIS HC A07/MF A01 CSCL 20D

Convection in circular and rectangular cylinders is analyzed. The governing equations and boundary conditions are formulated, linear and nonlinear stability theory are considered, and the physical implications of the theory are discussed. J.D.H.

N82-11391*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AMPLIFIED CROSSFLOW DISTURBANCES IN THE LAMINAR BOUNDARY LAYER ON SWEPT WINGS WITH SUCTION
J. Ray Dagenhart Nov. 1981 90 p refs
(NASA-TP-1902; L-14423) Avail: NTIS HC A05/MF A01 CSCL 20D

Solution charts of the Orr-Sommerfeld equation for stationary crossflow disturbances are presented for 10 typical velocity profiles on a swept laminar flow control wing. The critical crossflow Reynolds number is shown to be a function of a boundary layer shape factor. Amplification rates for crosslow disturbaces are shown to be proportional to the maximum crossflow velocity. A computer stability program called MARIA, employing the amplification rate data for the 10 crossflow velocity profiles, is constructed. This code is shown to adequately approximate more involved computer stability codes using less than two percent as much computer time while retaining the essential physical disturbance growth model. Author

N82-11392*# Water and Power Resources Service, Denver, Colo. Engineering and Research Center.
IMPINGING JETS
Robert L. George Dec. 1980 20 p refs
(PB81-227902; REC-ERC-80-8) Avail: NTIS HC A02/MF A01 CSCL 13B

A literature review on free jets striking solid boundaries is presented. A small-scale tests that have been made with and without a water cushion are described. The pressure is related to the velc city of the jet or height of fall or both. Several estimates for rate of velocity decrease, or excess pressure on a solid boundary are developed. One method is recommended for use in design procedures, which compares favorably with hydraulic model test data is recommended for use in design procedures. Model tests are recommended whenever the geometry of the spillway causes the flow to converage. Author

N82-11393*# Stanford Univ., Calif. Thermosciences Div.
A THREE-DIMENSIONAL SIMULATION OF TRANSITION AND EARLY TURBULENCE IN A TIME-DEVELOPING MIXING LAYER
A. B. Cain, W. C. Reynolds, and J. H. Ferziger Aug. 1981 140 p refs
(Contract NCC2-15)
(NASA-CR-164942; SU-TF-14) Avail: NTIS HC A07/MF A01 CSCL 20D

The physics of the transition and early turbulence regimes in the time developing mixing layer was investigated. The sensitivity of the mixing layer to the disturbance field of the initial condition is considered. The growth of the momentum thickness, the mean velocity profile, the turbulence kinetic energy, the Reynolds stresses, the anistropy tensor, and particle track pictures of computations are all examined in an effort to better understand the physics of these regimes. The amplitude, spectrum shape, and random phases of the initial disturbance field were varied. A scheme of generating discrete orthogonal function expansions on some nonuniform grids was developed. All cases address the early or near field of the mixing layer. The most significant result shows that the secondary instability of the mixing layer is produced by spanwise variations in the straining field of the primary vortex structures. J.D.H.

N82-11394*# Stanford Univ., Calif. Thermosciences Div.
MIXING OF A PASSIVE SCALAR IN ISOTROPIC AND SHEARED HOMOGENEOUS TURBULENCE
E. Shirani, J. H. Ferziger, and W. C. Reynolds May 1981 175 p refs
(Contract NCC2-15; Grant NSF ENG-78-17619)
(NASA-CR-164938; SU-TF-15) Avail: NTIS HC A08/MF A01 CSCL 20D

In order to calculate the velocity and scalar fields, the three dimensional, time-dependent equations of motion and the diffusion equation were solved numerically. The following cases were treated: isotropic, homogeneous turbulence with decay of a passive scalar; and homogeneous turbulent shear flow with a passive scalar whose mean varies linearly in the spanwise direction. The solutions were obtained at relatively low Reynolds numbers so

that all of the turbulent scales could be resolved without modeling. Turbulent statistics such as integral length scales, Taylor microscales, Kolmogorov length scale, one- and two-point correlations of velocity-velocity and velocity-scalar, turbulent Prandtl/Schmidt number, r.m.s. values of velocities, the scalar quantity and pressure, skewness, decay rates, and decay exponents were calculated. The results are compared with the available expermental results, and good agreement is obtained. T.M.

N82-11395*# Stanford Univ., Calif. Thermosciences Div.
HIGHER-LEVEL SIMULATIONS OF TURBULENT FLOWS
J. H. Ferziger Mar. 1981 152 p refs
(Grant NGR-2-15; Contract NCC2-15; Grant NSF ENG-78-17619)
(NASA-CR-164936; SU-TF-16) Avail: NTIS HC A08/MF A01 CSCL 20D

The fundamentals of large eddy simulation are considered and the approaches to it are compared. Subgrid scale models and the development of models for the Reynolds-averaged equations are discussed as well as the use of full simulation in testing these models. Numerical methods used in simulating large eddies, the simulation of homogeneous flows, and results from full and large scale eddy simulations of such flows are examined. Free shear flows are considered with emphasis on the mixing layer and wake simulation. Wall-bounded flow (channel flow) and recent work on the boundary layer are also discussed. Applications of large eddy simulation and full simulation in meteorological and environmental contexts are included along with a look at the direction in which work is proceeding and what can be expected from higher-level simulation in the future. A.R.H.

N82-11396*# Stanford Univ., Calif. Thermoscience Div.
NUMERICAL SIMULATION OF A COMPRESSIBLE HOMOGENEOUS, TURBULENT SHEAR FLOW Ph.D. Thesis
W. J. Feiereisen, W. C. Reynolds, and J. H. Ferziger Mar. 1981 195 p refs
(Contract NCC2-15)
(NASA-CR-164953; SU-TF-13) Avail: NTIS HC A09/MF A01 CSCL 20D

A direct, low Reynolds number, numerical simulation was performed on a homogeneous turbulent shear flow. The full compressible Navier-Stokes equations were used in a simulation on the ILLIAC IV computer with a 64,000 mesh. The flow fields generated by the code are used as an experimental data base, to examine the behavior of the Reynols stresses in this simple, compressible flow. The variation of the structure of the stresses and their dynamic equations as the character of the flow changed is emphasized. The structure of the tress tensor is more heavily dependent on the shear number and less on the fluctuating Mach number. The pressure-strain correlation tensor in the dynamic uations is directly calculated in this simulation. These correlations are decomposed into several parts, as contrasted with the traditional incompressible decomposition into two parts. The performance of existing models for the conventional terms is examined, and a model is proposed for the 'mean fluctuating' part. S.L.

N82-11397*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LEWIS RESEARCH CENTER'S COAL-FIRED, PRESSURIZED, FLUIDIZED-BED REACTOR TEST FACILITY
John A. Kobak and R. James Rollbuhler Oct. 1981 35 p refs
(NASA-TM-81616; E-621) Avail: NTIS HC A03/MF A01 CSCL 20D

A 200-kilowatt-thermal, pressurized, fluidized-bed (PFB) reactor, research test facility was designed, constructed, and operated as part of a NASA-funded project to assess and evaluate the effect of PFB hot-gas effluent on aircraft turbine engine materials that might have applications in stationary-power-plant turbogenerators. Some of the techniques and components developed for this PFB system are described. One of the more important items was the development of a two-in-one, gas-solids separator that removed 95+ percent of the solids in 1600 F to 1900 F gases. Another was a coal and sorbent feed and mixing system for injecting the fuel into the pressurized combustor. Also important were the controls and data-acquisition systems that enabled one person to operate the entire facility. The solid, liquid, and gas sub-systems all had problems that were solved over the 2-year operating time of the facility, which culminated in a 400-hour, hot-gas, turbine test. A.R.H.

N82-11398*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPUTER SOLUTION TO THE STATIONARY NAVIER-STOKES EQUATIONS IN TWO DIMENSIONS WITH PROVEN CONVERGENCE
Ralph E. Gabrielsen Sep. 1981 11 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif. Sponsored in part by Army Aviation Research and Development Command, St. Louis
(NASA-TM-81300; A-8604; USAAVRADCOM-TR-81-19-A) Avail: NTIS HC A02/MF A01 CSCL 20D

A general computer solution for the stationary Navier-Stokes equations is developed. It is explicity proved that this solution converges to the true solution as the grid size shrinks to zero. Author

N82-11399*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH THERMAL POWER DENSITY HEAT TRANSFER Patent Application
James F. Morris, inventor (to NASA) Filed 30 Oct. 1980 10 p
(NASA-Case-LEW-12950-1; US-Patent-Appl-SN-202228) Avail: NTIS HC A02/MF A01 CSCL 20D

Heat from a high temperature heat pipe is transferred through a vacuum or a gap filled with electrically nonconducting gas to a cooler heat pipe. The heat pipe is used to cool the nuclear reactor while the heat pipe is connected thermally and electrically to a thermionic converter. If the receiver requires greater thermal power density, geometries are used with larger heat pipe areas for transmitting and receiving energy than the area for conducting the heat to the thermionic converter. In this way the heat pipe capability for increasing thermal power densities compensates for the comparatively low thermal power densities through the electrically non-conducting gap between the two heat pipes. NASA

N82-11400# Coastal Engineering Research Center, Fort Belvoir, Va. Coastal Processes and Structures Branch.
CRITICAL WAVE CONDITIONS FOR SAND MOTION INITIATION
Robert J. Hallermeier Jul. 1981 18 p refs
(AD-A104376; CERC-CETA-81-10) Avail: NTIS HC A02/MF A01 CSCL 08/1

Sand and fluid characteristics together with the period of oscillatory flow determine the peak fluid velocity needed for sand motion initiation. With linear wave theory, this threshold peak near-bottom velocity can be used to calculate critical wave conditions for sand motion - either the minimum wave height in a given water depth, or the maximum water depth with a given wave height, for a given wave period. The procedure presented here permits prediction of the seaward extent of bed activity due to wave action in field and laboratory situations. Example calculations are provided. Author (GRA)

N82-11401# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
INVESTIGATION OF HEAT TRANSFER IN STRAIGHT AND CURVED RECTANGULAR DUCTS FOR LAMINAR AND TRANSITION FLOWS M.S. Thesis
Robert George Holihan, Jr. Jun. 1981 81 p refs
(AD-A104604) Avail: NTIS HC A05/MF A01 CSCL 20/13

An experimental investigation was conducted to examine convection heat transfer in a duct of rectangular cross-section, having both a straight and curved flow passage. One wall was kept at a constant temperature, with the opposite wall being adiabatic. Heating of the air flowing in the channel was accomplished through Joulean heating of a wall composed of Temsheet. The experiments were conducted for steady state in laminar and transition flows. Development and propagation of the Taylor-Gortler vortices was shown to enhance the heat transfer rate in the curved section as compared to the straight section. Author (GRA)

N82-11402# Pennsylvania State Univ., University Park. Applied Research Lab.

CORRECTING FOR THE SIDEWALL BOUNDARY LAYER IN SUBSONIC TWO-DIMENSIONAL AIRFOIL/HYDROFOIL TESTING

A. L. Treaster, P. P. Jacobs, and G. B. Gurney 25 Aug. 1981 40 p refs Proposed for presentation at the AIAA 12th Aerodyn. Testing Conf., Williamsburg, Va., Mar. 1982

(Contract N00024-79-C-6043)

(AD-A104562; ARL/PSU-TM-81-176) Avail: NTIS HC A03/MF A01 CSCL 20/4

Historically, two dimensional airfoil or hydrofoil section characteristics have been obtained by measuring individually the lift, drag and pitching moment by the most accurate technique available. The use of force balances to measure the three quantities simultaneously has met with only partial success. Although the lift and pitching moment data have usually been acceptable, the drag data have varied by as much as an order of magnitude from the accepted NACA reference data. To investigate the parameters which influence two dimensional force measurement and force balance design, an experimental program was conducted in the subsonic wind tunnel of the Applied Research Laboratory at the Pennsylvania State University (ARL/PSU). From the results of this test program the sidewall boundary layer was identified as the primary factor contributing to the erroneous drag measurements. A correction procedure which is based on the airfoil/hydrofoil geometry, the flow environment and the measured data was developed. Corrected data from the subject test program and from similar programs in other experimental facilities for both symmetrical and cambered sections are in good agreement with NACA data in all cases.

Author (GRA)

N82-11403# United Technologies Research Center, East Hartford, Conn.

DEVELOPMENT OF PREDICTION METHOD FOR TRANSONIC SHOCK INDUCED SEPARATED FLOW Final Report, May 1980 - Mar. 1981

J. E. Carter Sep. 1981 38 p refs

(Contract N00014-80-C-0424)

(AD-A104566; UTRC/R80-915213-4) Avail: NTIS HC A03/MF A01 CSCL 20/4

In the present study it has been demonstrated that a finite difference technique for viscous-inviscid interaction, previously developed and demonstrated by the author for subsonic turbulent separated flows, is applicable to the problem of transonic shock induced separated flow. Converged solutions have been obtained and favorable comparisons with experimental data show that this method is capable of resolving the detailed features of this strongly interacting flow. These interaction calculations are aided by the use of a new shear layer coordinate system which is aligned with an estimated position of the shear layer in the large separated region. Author (GRA)

N82-11404# Denver Research Inst., Colo.

TWO-PHASE FLOW IN GEOTHERMAL ENERGY SOURCES Final Technical Report

Jul. 1981 240 p refs Prepared jointly with Coury and Associates, Lakewood, Colo. and Houston Univ.

(Contract De-AC02-76ET-28359)

(DE81-029037; DOE/ET-28359/T1) Avail: NTIS Hc A11/MF A01

A geothermal well consisting of single and two-phase flow sections was modeled in order to explore the variables important to the process. For this purpose a computer program was developed in a versatile form in order to be able to incorporate a variety of two phase flow void fraction and friction correlations. A parameteric study indicated that the most significant variables controlling the production rate are hydrostatic pressure drop or void fraction in the two-phase mixture and heat transfer from the wellbore to the surrounding earth. Downhole instrumentation was developed and applied in two flowing wells to provide experimental data for the computer program. The wells (East Mesa 8-1, and a private well) behaved differently. Well 8-1 did not flash and numerous shakedown problems in the probe were encountered. The private well did flash and the instrumentation detected the onset of flashing. A Users Manual was developed and presented in a workshop held in conjunction with the Geothermal Resources Council. DOE

N82-11405# Oak Ridge National Lab., Tenn. Energy Div.

CYCLE AND PERFORMANCE ANALYSIS OF ABSORPTION HEAT PUMPS FOR WASTE HEAT UTILIZATION

Horacio Perez-Blanco and Gershon Grossman Sep. 1981 56 p refs

(Contract W-7405-eng-26)

(DE81-030705; ORNL/TM-7852) Avail: NTIS HC A04/MF A01

A heat pump was designed to upgrade low-temperature waste heat by boosting its temperature typically from 600 C (1400 F) to 1200 C (2500 F). The system uses part of the low-temperature heat as its energy source and does not need outside power, except for running small auxiliary equipment. The heat pump employs a desorber/evaporator combination in which some hot water from the heat source is evaporated and the vapor is absorbed in a concentrated absorbent solution. The heat of absorption serves to raise the temperature of the rest of the hot water stream. Two stages of the system are used in series to provide the desired temperature boost. Both are served by one desorber which uses part of the waste heat to concentrate the solution. Both open- and closed-cycle regeneration of the solution was studied. The operation of the system is described and its performance criteria defined. Results of a computer study show the variation in performance with different design variables. Two working materials, LiBr-water and LiCl-water, are considered.

DOE

N82-11406# Tower Systems, Inc., Tacoma, Wash.

MAGMA COOLING-TOWER PROCESS PILOT-PLANT DEMONSTRATION Final Report

W. G. Sanderson May 1981 159 p Sponsored by EPRI Prepared for Nevada Power Co., Las Vegas

(DE81-903783; EPRI-CS-1838; EPRI-TPS-79-740) Avail: NTIS HC A08/MF A01

A binary cooling process involves vertically oriented water-water-air falling film heat exchangers which are configured for indirect cooling of a primary fluid through evaporation of a secondary fluid into an air stream. The secondary fluid is contained in a circulating loop within the magma cooling tower (MCT) and is composed of treated plant waste water. The secondary fluid is exposed primarily to low temperature non-metallic surfaces and can be maintained at very high dissolved solids levels. The capability of the MCT to evaporate and concentrate waste water blowdown using low quality waste energy from the cooling water loop was evaluated as well as the control of scaling, fouling and corrosion in the high solids brine environment of the MCT secondary loop. Two modes of scale control were tested. Results were within the limits predicted prior to the test. DOE

N82-11407# Science Applications, Inc., McLean, Va. Solar Technology Div.

PARAMETRIC SENSITIVITY STUDY FOR SOLAR-ASSISTED HEAT-PUMP SYSTEMS Final Report

N. M. White and J. H. Morehouse Jul. 1981 110 p refs Prepared for Midwest Research Inst., Golden, Colo.

(Contracts DE-AC02-77CH-0017; EG-77-C-01-4042)

(DE81-030309; SERI/TR-98288-1) Avail: NTIS HC A06/MF A01

The engineering and economic parameters affecting life-cycle costs for solar-assisted heat pump systems are investigted. The change in energy usage resulting from each engineering parameter varied was developed from computer simulations, and is compared with results from a stand-alone heat pump system. Three geographical locations are considered: Washington, DC, Fort Worth, TX, and Madison, WI. Results indicate that most engineering changes to the systems studied do not provide significant energy savings. The most promising parameters to ary are the solar collector parameters tau (-) and U/sub L/ the heat pump capacity at design point, and the minimum utilizable evaporator temperature. Costs associated with each change are estimated, and life-cycle costs computed for both engineering parameters and economic variations in interest rate, discount rate, tax credits, fuel unit costs and fuel inflation rates. Results indicate that none of the feasibile engineering changes for the system configuration studied will make these systems economic-

ally competitive with the stand-alone heat pump without a considerable tax credit. DOE

N82-11408# Los Alamos Scientific Lab., N. Mex.
DIFFUSIVITY OF PARTICLES MOVING RAPIDLY THROUGH A TURBULENT FLUID
L. G. Margolin Aug. 1981 10 p refs
(Contract W-7405-eng-36)
(DE81-030414; LA-8875) Avail: NTIS HC A02/MF A01

The theoretical assumptions concerning the diffusion of small particles in a turbulent fluid are contrasted with experimental observations. Theoretical studies predict that particles will diffuse like passive scalars. Experimental measurements of the diffusion of small beads in turbulent air yield particle diffusivities much smaller than passive scalar diffusivity. One assumption, usually called the neighborhood hypothesis, is not justifiable when the particles have a large mean velocity relative to the fluid. A model, valid in these circumstances, and in good agreement with the experiment is constructed. DOE

N82-11409# Oak Ridge National Lab., Tenn. Dept. of Barrier Technology.
PORTABLE TRANSFER STANDARDS FOR PRESSURE AND GAS FLOW MEASUREMENTS
D. E. Fain and T. W. Selby Jan. 1981 27 p refs Presented at the 2nd Intern. Symp. on Flow, St. Louis, 6 Apr. 1981
(Contract W-7405-eng-26)
(DE81-024445; K/ET-5014-Rev-2; CONF-810434-6-Rev-2) Avail: NTIS HC A03/MF A01

A system of portable transfer standards for pressures and gas flow measurements developed to assure that different measurement systems at different locations are measuring relative to the same standards is described. The factors necessary to observe and control are discussed in addition to calibration procedures and operational results. The capability of maintaining a long term reproducibility of 0.1% for a flow system is demonstrated. A limited amount of data from a preliminary cross check shows agreement to better than 0.1% at the 95% confidence level. DOE

N82-11410# Oak Ridge National Lab., Tenn. Computer Sciences Div.
STEFAN PROBLEM WITH A CONVECTIVE BOUNDARY CONDITION
A. D. Solomon, V. Alexiades, and D. G. Wilson Aug. 1981 36 p refs
(Contract W-7405-eng-26)
(DE81-030424; ORNL/CSD-81) Avail: NTIS HC A03/MF A01

The one-phase Stefan problem on a semi-finite strip x greater than or equal to 0, with the convective boundary condition -KT/sub x/(0,t) = [T/sub L/-T (0,t)] is investigated.The behavior of the surface temperature T(0,t), asymptotic behavior as h (FEMALE) infinity, uniqueness, and bounds on the phase change front and total system energy are studied. DOE

N82-11411# Battelle Pacific Northwest Labs., Richland, Wash.
MEAN VALUES AND AN INVERSE PROBLEM FOR POROUS MEDIA FLOW
E. M. Arnold 1980 21 p refs Presented at the SIAM Meeting, Houston, Tex., 6 Nov. 1980
(Contract DE-AC06-76RL-01830)
(DE81-027210; PNL-SA-8768; CONF-801166-3) Avail: NTIS HC A02/MF A01

Connections between integral mean values of a function and partial differential equations satisfied by that function are used to establish an equivalent integral-geometric form of an inverse problem for porous media flow. Some sequences of this equivalence and global existence results are presented. DOE

N82-11412# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
DESIGN, OPERATION AND PERFORMANCE OF A GROUND COUPLED HEAT PUMP SYSTEM IN A COLD CLIMATE
P. D. Metz 1981 8 p refs Presented at the 16th Intersoc. Energy Conversion Eng. Conf., Atlanta, 9-14 Aug. 1981; sponsored by ASME
(Contract DE-AC02-76CH-00016)
(DE81-024257; BNL-29625; CONF-810812-25) Avail: NTIS HC A02/MF A01

An antifreeze filled serpentine earth coil was designed to just meet heating needs of a small, well insulated house with an average brine temperature never less than 7 C (20 F). The 155 m (507 ft) long, 1.2 m (4 ft) coil made from nominal size 1-1/2 in medium density polyethylene pipe was installed by a local plumbing contractor using two different chain driven trenchers. A commercially available water to air heat pump was used with minor modifications. System performance was monitored using kilowat hour meters, a Btu meter, and a datalogger microcomputer data acquisition system. The house temperature was kept between 21 and 23 C (70 and 74 F) all winter despite outdoor temperature as low as 24 C (-11 F). During a period when the outdoor temperature averaged -2 C (28 F), the system extracted approximately 10.2 x 10 to the 9th power 3 (9.7 x 10 to the 6th power Btu) from the ground with an almost constant heat pump COP (coefficient of performance) averaging about 2.3 and a system COP of 2.2. No resistance heating was used. DOE

N82-11413# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
DOE SOLAR-ASSISTED HEAT-PUMP PROGRAM: ITS EVOLUTION AND ITS POTENTIAL
J. W. Andrews 1981 5 p refs Presented at the Active Solar Contractors' Rev. Meeting, Washington, D.C. Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-026055; BNL-29677; CONF-810912-10) Avail: NTIS HC A02/MF A01

Progress in the solar assisted heat pump program is described in terms of the progressive modification of original assumptions on the basis of accumulating experience. The ways in which these modifications led to enhanced system potential are explained. A major impetus for progress is the assimilation and reconciliation of divergent systems analysis results. Technical accomplishments in the program are described, and needed future activities are listed. DOE

N82-11414# Brookhaven National Lab., Upton, N. Y. Energy Storage and Conversion Div.
CHEMICAL HEAT PUMP PROGRAM: AN OVERVIEW
Alessio Mezzina 1981 5 p Presented at the Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025086; BNL-29592; CONF-810672-22) Avail: NTIS HC A02/MF A01

Chemical heat pumps comprise reversible reactions which can be driven by low grade heat. Thermal energy is absorbed in one direction and liberated in the reverse direction; thus, serving as a basis for system designs applicable to space conditioning or process heat management and offering the capability for high density energy storage as an integral part of the system. The program background, rationale, technology, and research and development needs are described. DOE

N82-11415# Oak Ridge National Lab., Tenn.
COMPUTER-AIDED HEAT-PUMP DESIGN AND OPTIMIZATION
S. K. Fischer and C. K. Rice 1981 4 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024965; CONF-810672-1) Avail: NTIS HC A02/MF A01

Analytical methods to predict the performance of existing and proposed heat pumps and computer programs to serve as tools for the design and optimization of high efficiency heat pumps are described. A computer model of electric-motor-driven heat pumps was developed to provide detailed analyses of the performance of existing or proposed heat pumps. To the extent possible, the model is based on the physical principles underlying the processes and on basic correlations, with minimal use of empirical correlations. The computer program is oganized to facilitate its use by engineers who want to concentrate on a heat pump design, not a computer program. The heat pump model was connected to an optimization program. The heat pump

design, not a computer program. The heat pump model was connected to an optimization program in order to maximize the predicted heating efficiency by simultaneously varying ten design parameters to find the combination giving the highest COP at a specified heating capacity. DOE

N82-11416# Oak Ridge National Lab., Tenn. Energy Div.
LABORATORY DETERMINATION OF FROSTING AND DEFROSTING LOSSES FOR A HIGH EFFICIENCY AIR-SOURCE HEAT PUMP
W. A. Miller and R. D. Ellison 1981 4 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023218; CONF-810672-2) Avail: NTIS HC A02/MF A01

Tests to detail system and component performance data, to quantify the dynamic losses, and to seek and evaluate methods for reducing these losses were performed. A high efficiency split-system heat pump was installed in two separate air loops, with one loop housng the indoor and the other housing the outdoor unit. Calculations of the heat pump's performance based on air-side measurements were within 3% of that based on refrigerant side measurements. Performance of the heat pump was measured under steady-state, dehumidification, and frosting-defrosting conditions with major emphasis placed on the dynamic frosting operation of the system. The system and component performance was evaluated for ambient temperature levels of 8.3, 4.4, 1.7, -1.1 and -8.3 C, and for discrete humidity levels ranging from 50 to 90%. DOE

N82-11417# Oak Ridge National Lab., Tenn. Energy Div.
ALTERNATIVE HEAT PUMP CYCLE STUDIES
F. A. Creswick 1981 4 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024983; CONF-810672-3) Avail: NTIS HC A02/MF A01

Alternative heat pump cycles for space conditioning applications that offer improved performance or the option to use a non-chlorofluorocarbon working fluid are considered. Various air-cycle systems, the Stirling cycle, and an ejector cycle were examined. The concept is discussed. Results of preliminary studies on the air cycles and the Stirling heat pump are discussed briefly. Ejector heat pump studies are at a very preliminary stage and no conclusions have been made. DOE

N82-11418# E-Tech, Inc., Atlanta, Ga.
INVESTIGATION OF DIRECT EXPANSION IN GROUND SOURCE HEAT PUMPS
Mark D. Kalman 1981 6 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024139; CONF-810672-5) Avail: NTIS HC A02/MF A01

A fully instrumented subscale ground coupled heat pump system was developed, and built, and used to test and obtain data on three different earth heat exchanger configurations under heating conditions (ground cooling). Various refrigerant flow control and compressor protection devices were tested for their applicability to the direct expansion system. Undistributed Earth temperature data were acquired at various depths. The problem of oil return at low evaporator temperatures and low refrigerant velocities was addressed. An analysis was performed to theoretically determine what evaporator temperature can be expected with an isolated ground pipe configuration with given length, pipe size, soil conditions and constant heat load. Technical accomplishments to data are summarized. DOE

N82-11419# Pittsburg Univ., Pa. Dept. of Mechanical Engineering.
WELL-WATER-SOURCE HEAT PUMP FIELD PERFORMANCE STUDY
R. S. Dougall 1981 5 p refs Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024136; CONF-810672-7) Avail: NTIS HC A02/MF A01

Two well-water source heat pumps (WWSHPs) were instaled in two single-family residences in rural south-central Pennsylvania to supply heating in the winter and cooling during the summer. The heat pump installations are being instrumented with an automated data gathering system for evaluating the performance of the systems. The instrumentation and data acquisition system design was completed and a preliminary design of the control logic and data reduction software for the minicomputer to be located at the sites was obtained. DOE

N82-11420# Battelle Memorial Inst., Columbus, Ohio.
CONDUCT A STATE-OF-THE-ART SURVEY OF EXISTING KNOWLEDGE FOR THE DESIGN OF GROUND-SOURCE HEAT PUMPS Topical Report, Sep. 1980 - May 1981
David Ball 1981 6 p refs Presented at DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Prepared for Oak Ridge National Lab.
(Contract W-7405-eng-26)
(DE81-024084; CONF-810672-9) Avail: NTIS HC A02/MF A01

Historic and current methods for designing ground-coil heat pumps with emphasis on European and North American experiences are discussed. Approximately 27 individual design and performance evaluation method were studied with most of them employing computer techniques. Modeling categories include steady-state analytical and transient analytical lumped parameter finite difference and finite element in one, two, and three dimensions. A discussion of each is presented. DOE

N82-11421# Little (Arthur D.), Inc., Cambridge, Mass.
ASSESSMENT OF I.C. ENGINES AS DRIVERS FOR HEAT ACTUATED HEAT PUMPS
J. C. Burke, W. P. Teagan, and P. G. Goff 1981 6 p Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-024086; CONF-810672-11) Avail: NTIS HC A02/MF A01

The present suitability and future potential of gas-fired and oil-fired internal combustion (IC) engines for use in heat-actuated heat pumps for space conditioning applications are assessed. Drives for residential and light commercial machines up to 100 KW output or approximately 50 HP engine input are considered. A conceptual design identifying major generic elements was prepared to serve as a basis for estimating performance maintenance costs. A review of prior experiences with IC engines with heat pumps used in similar situations was conducted. Capital costs and maintenance costs were estimated and diesel and spark ignition engine efficiencies were determined. Institutional and operational considerations were identified. DOE

N82-11422# Oak Ridge National Lab., Tenn. Energy Div.
HEAT PUMP R AND D AT OAK RIDGE NATIONAL LABORATORY
R. D. Ellison and F. A. Creswick 1981 4 p refs Presented at DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024121; CONF-810672-13) Avail: NTIS HC A02/MF A01

Heat pump system and component performance evaluations at steady state and under frosting conditions are described. A computer model of electric motor driven heat pumps was developed to explore the practical limits of steady-state heating efficiency of conventional air-source heat pumps, and to demonstrate an approach to computer-aided heat pump design techniques. Scoping calculations of alternative heat pump systems, such as aircycle heat pumps and electric motor driven Stirling heat pumps are presented. Computer programs were written to model the expected performance of vertical-pipe ground-coupled heat exchangers, and for the detailed performance analysis of air-to-refrigerant heat exchangers with complex refrigerant circuiting by calculating the performance of each tube of the heat exchanger individually. Seasonal performance factors for air-source heat pumps using hour-by-hour calculations with

empirical temperature dependent degradation factors were estimated. DOE

N82-11423# Mechanical Technology, Inc., Latham, N. Y.
DIAPHRAGM STIRLING ENGINE HEAT-ACTUATED HEAT PUMP DEVELOPMENT
Robert A. Ackermann and Paul Swenson (Consolidated Natural Gas Research Co.) 1981 5 p Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024076; CONF-810672-14) Avail: NTIS HC A02/MF A01

A power module, consisting of a free displacer, resonant Stirling engine, hydraulic transmission, and resonant Rankine refrigerant (F-22) compressor, embodies several innovative concepts in free-piston Stirling engine heat pump design that will advance the state of the art of this technology. Progress is reported in three areas of the program. A compressor/engine matching analysis and a stability analysis show that the power module, which is representative of a two-degree-of-freedom resonant system, can operate stably over the full range of heat pump conditions. A compressor design evolved that has met criteria for performance and cost. Tests employing a hydraulic simulator test rig show that the transmission losses are less than had been predicted, and that properly designed and fabricated diaphragms can attain long life. DOE

N82-11424# Arkla Industries, Inc., Evansville, Ind.
DEVELOPMENT AND DEMONSTRATION OF AN AMMONIA-WATER ABSORPTION HEAT PUMP
Richard H. Merrick 1981 4 p Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Prepared for ORNL
(Contract W-7405-eng-26)
(DE81-024126; CONF-810672-20) Avail: NTIS HC A02/MF A01

Development of a residential air-source ammonia-water absorption heat pump designed to operate in the heating mode only and deliver its output as hot water is described. A prototype unit was developed and plans to operate three life test and three field test units in a northern climate during the winter are described. Prototype specifications are 50,000 Btu input, 125 F supply water, 105 F return water, and COP 1.25 at 47 F ambient and COP 1.12 at 17 F ambient. DOE

N82-11425# Colorado State Univ., Fort Collins. Dept. of Agricultural and Chemical Engineering.
STUDIES OF HEAT TRANSFER AND WATER MIGRATION IN SOILS Final Report, 1 May 1979 - 30 Sep. 1980
W. R. Walker, James D. Sabey, and Diane R. Hampton Apr. 1981 140 p refs
(Contract DE-AC02-79CS-30139)
(DE81-023951; DOE/CS-30139/T1) Avail: NTIS HC A07/MF A01

Simultaneous transfer of heat and water through partially saturated soils was described by both theoretical analyses and laboratory measurements. The theoretical efforts produced computer coded simulation models of coupled water and heat flux in soils and thermal conductivity as a function of water content, bulk density, mineralogical composition, and temperature. The laboratory data were used to calibrate and verify the simulation models. A prototype thermal storage reservoir using in-situ soil materials was constructed and evaluated. The feasibility of trans-seasonal heat storage was demonstrated. Efficient use of in-situ soil materials as a heat storage system requies that wet soil be used to store the heat while surrounding soils be as dry as possible. To accomplish this separation, various impermeable barriers were studied. DOE

N82-11426# Los Alamos Scientific Lab., N. Mex.
PERFORMANCE PREDICTIONS AND MEASUREMENTS FOR SPACE-POWER-SYSTEM HEAT PIPES
F. Coyne Prenger, Jr. 1981 16 p refs Presented at the 4th Intern. Heat Pipe Conf., London, 7-10 Sep. 1981
(Contract W-7405-eng-36)
(LA-UR-81-909; CONF-810902-1) Avail: NTIS HC A02/MF A01

High temperature liquid metal heat pipes designed for space power systems were analyzed and tested. Three wick designs are discussed and a design rationale for the heat pipe is provided. Test results on a molybdenum, annular wick heat pipe are presented. Performance limitations due to boiling and capillary limits are presented. There is evidence that the vapor flow in the adiabatic section is turbulent and that the transition Reynolds number is 4000. DOE

N82-11427# Los Alamos Scientific Lab., N. Mex.
PERFORMANCE LIMITS OF GRAVITY-ASSIST HEAT PIPES WITH SIMPLE WICK STRUCTURES
F. Coyne Prenger, Jr. and J. E. Kemme 1981 10 p refs Presented at 4th Intern. Heat Pipe Conf., London, 7 Sep. 1981
(Contract W-7405-eng-36)
(LA-UR-81-969; CONF-810902-3) Avail: NTIS HC A02/MF A01

The use of gravity-assist heat pipes with simple wick structures to establish performance limits due to entrainment of the liquid by the counterflowing vapor was investigated. A physical model is postulated which leads to a single correlation predicting entrainment limits for all data investigated. The characteristic length in the entrainment parameter is the depth of the wick structure and the model infers an upper bound on this parameter. DOE

N82-11428# Los Alamos Scientific Lab., N. Mex.
HEAT-PIPE DEVELOPMENT FOR HIGH-TEMPERATURE RECUPERATOR APPLICATION
M. Merrigan, W. Dunwoody, and L. Lundberg 1981 14 p refs Presented at Heat Pipe Conf., London, 7 Sep. 1981 Submitted for publication
(Contract W-7405-eng-36)
(LA-UR-81-1414; CONF-810902-4) Avail: NTIS HC A02/MF A01

The development of heat pipes for operation in oxidizing atmospheres at temperatures above 1100 K is described. The heat pipes comprise a metallic liner and wick stucture with a protective outer shell of an oxidation resistant material. The working fluids used in the heat pipes are alkali metals. A number of configurations were evaluated, ranging from pipes using a metallic inner liner of a chemically vapor deposited (CVD) refractory metal applied to ceramic tubing, to one utilizing ferrous materials with an outer layer of a developed oxide. A promising intermediate configuration consisting of free-standing refractory tubing covered with a layered structure of fine grain, equi-axed CVD silicon carbide was evaluated. The test heat pipe was fabricated using low-carbon, arccast molybdenum tubing and a wick composed of 150 mesh molybdenum screen. After coating, the pipe was operated in air and in combustion gases for performance evaluation. The use of iron-chromium-aluminum alloys as container materials for operating in high temperature oxidizing and sulfiding gas streams was investigated. DOE

N82-11429# Mechanical Technology, Inc., Latham, N. Y.
LIQUID-PARTICLE DYNAMICS AND RATE OF EVAPORATION IN THE ROTATING FIELD OF CENTRIFUGAL COMPRESSORS
Oscar Pinkus 1981 42 p refs Presented at the Symp. on Energy and Environment, Turbomachinery Technol., Patras, Greece, 22-26 Jun. 1981 Prepared in cooperation with Oak Ridge National Lab.
(Contract W-7405-eng-26)
(DE81-024075; CONF-8106101-1) Avail: NTIS HC A03/MF A01

A model is presented which consists of injecting a liquid coolant into the vapor of centrifugal compressors via slots in the rotating blades in order to achieve isothermal compression and thus minimal work input. The 3-dimensional analysis determines the relative velocities and trajectories of the liquid particles, and their rate of vaporization as a function of the prevailing flow field and inlet conditions. Inertia, viscous drag, centrifugal and Coriolis forces are all included. The computer-obtained results show that for optimum conditions and to avoid collision with the blades, it is desirable that injection occur at the suction side of the blades and close to the hub; that low rather than high initial particle velocities are preferred; and that small droplet sizes are required both to avoid blade erosion and

to assure the highest rate of vaporization. The analysis also shows that vaporization levels will remain low unless the compressed vapor is at relatively high temperatures. DOE

N82-12022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DIFFERENCE METHOD IN FLUID DYNAMICS. 1. NUMERICAL SOLUTION OF TWO DIMENSIONAL VORTICITY EQUATION
Guo Benyu *In its* Acta Mech. Sinica (Selected Articles) FTD-ID(RS)T-0705-81 15 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS CSCL 20/4

N82-12024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE CAPACITY OF HOLOGRAPHIC PHASE-SHIFT INTERFEROMETRIC TECHNIQUE IN THE VISUALIZATION OF LOW DENSITY FLOWS
Hau Yu Li, Chao Yi Xu, Jizu Shu, and Jin Min Hu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 51-63 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS CSCL 20/4

N82-12026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL COMPUTATION AND ANALYSIS OF THE FLOW FIELD IN A LARGE SHOCK TUBE WITH A VARIABLE CROSS-SECTIONAL AREA
Wen Xuan Li and Jiajun Wang *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 75-83 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS CSCL 20/4

N82-11022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PREDICTION OF TURBULENT BOUNDARY LAYER SEPARATION
Wu Guo-chuan *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0706-81) 15 Sep. 1981 p 37-44 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 3, 1979 (For primary document see N82-11019 02-01)
Avail: NTIS CSCL 01/2

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-11430 California Univ., Los Angeles.
THE PIEZOMAGNETIC EFFECT: LIMITS ON DETECTABILITY USING A COMBINED VECTOR AND SCALAR MAGNETOMETER ARRAY Ph.D. Thesis
Craig Allen Searls 1981 309 p
Avail: Univ. Microfilms Order No. 8121053

The combined data from two types of magnetic observatories were used to determine the operational characteristics of the magnetometers in the remote observatory environment. The initial run of the magnetometers demonstrated that in addition to the normal magnetic variation associated with the disturbance of the magnetosphere there is also a component of the magnetic records associated with oceanic tides. Other factors contribution to the residual variation in the magnetic difference fields are local differnces in susceptibility, conductivity, and magnetic field orientation. These effects can be removed by linear prediction filtering techniques with vector field information as the input. The primary conclusion was that the instrumental noise level for both the proton precession and the vector fluxgate magnetometers are needed. Dissert. Abstr.

N82-11431* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SMALL CONDUCTIVE PARTICLE SENSOR Patent
Israel Taback, inventor (to NASA) (Bionetics Corp., Hampton, Va.) Issued 25 Aug. 1981 5 p Filed 28 Aug. 1979 Supersedes N80-11400 (18 - 02, p 0195) Sponsored by NASA
(NASA-Case-LAR-12552-1; US-Patent-4,286,209; US-Patent-Appl-SN-070366; US-Patent-Class-324-71CP; US-Patent-Class-235-92PC) Avail: US Patent and Trademark Office CSCL 14B

An electrostatic conductive fiber detector is disclosed for use in detecting, counting and measuring the length of fibers down to 0.1 mm and below with increased accuracy and reliability over prior art devices. It can be used for detection of fibers suspending in a flowing gas, in a nonflowing gas, or in a vacuum and its accumulated counts over a period of time is essentially unaffected by velocity of the fibers being detected.
Official Gazette of the U.S. Patent and Trademark Office

N82-11432* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
METHOD FOR RETARDING DYE FADING DURING ARCHIVAL STORAGE OF DEVELOPED COLOR PHOTOGRAPHIC FILM Patent
Richard B. Hoover and Charles M. Rhodes, inventors (to NASA) Issued 1 Sep. 1981 4 p Filed 7 Feb. 1980 Supersedes N80-18362 (18 - 09, 1139)
(NASA-Case-MFS-23250-1; US-Patent-4,287,152; US-Patent-Appl-SN-119340; US-Patent-Class-422-40; US-Patent-Class-430-17; US-Patent-Class-430-372) Avail: US Patent and Trademark Office CSCL 14E

Dye fading during archival storage of developed color photographic film is retarded by placing the film in a sealed, opaque vault, introducing a dry, pressurized inert gas into the vault while the latter is vented, and sealing the vault after the air within the vault has been purged and replaced by the inert gas. Preferably, the gas is nitrogen; and the vault is stored at a temperature below room temperature to preserve the color photographic emulsions on the film contained within the vault. For short-term storage, sodium thiocyanate pads charged with water are placed within the vault. For long term storage, the interior of the vault is kept at a low relative humidity.
Official Gazette of the U.S. Patent and Trademark Office

N82-11433# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR APPARATUS FOR GAMMA RADIOGRAPHY
5 Nov. 1980 21 p refs
(SABS-1317-1980; ISBN-0-626-05688-8; GR-8) Avail: NTIS HC A02/MF A01

The constructional requirements of portable, mobile, and fixed apparatus for gama radiography designed to allow the controlled use of radiation for industrial purposes are specified. Apparatus operated by removing the sealed source from the exposure container on a handlin device is not covered by this specification. The performance requirements which such apparatus should meet in order to safeguard people from radiation hazards during its normal operation are presented. J.D.H.

N82-11434*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DYNAMIC MOIRE METHODS FOR DETECTION OF LOOSENED SPACE SHUTTLE TILES
W. L. Snow, A. W. Burner, and W. K. Goad Sep. 1981 17 p refs
(NASA-TM-83205) Avail: NTIS HC A02/MF A01 CSCL 14B

Moire fringe methods for detecting loose space shuttle tiles were investigated with a test panel consisting of a loose tile surrounded by four securely bonded tiles. The test panel was excited from 20 to 150 Hz with in-plane sinusoidal acceleration of 2 g (peak). If the shuttle orbiter can be subjected to periodic excitation of 1 to 2 g (peak) and rigid-body periodic displacements do not mask the change in the Moire pattern due to tile

looseness, then the use of projected Moire fringes to detect out-of-plane rockin appears to be the most viable indicator of tile looseness since no modifications to the tiles are required.
Author

N82-11435*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LOW-COST SOLAR ARRAY PROJECT: FOUR ABSOLUTE CAVITY RADIOMETER (PYRHELIOMETER) INTERCOMPARISONS AT NEW RIVER, ARIZONA: RADIOMETER STANDARDS
Roger S. Estey and Clay H. Seaman Jul. 1981 207 p refs
(Contracts NAS7-100; EX-76-A-29-1012; DE-AI01-76ET-20356)
(NASA-CR-164950; JPL-Pub-81-60) Avail: NTIS HC A10/MF A01 CSCL 14B

Four detailed intercomparisons were made for a number of models of cavity-type self-calibrating radiometers (pyrheliometers). Each intercomparison consisted of simultaneous readings of pyrheliometers at 30-second intervals in runs of 10 minutes, with at least 15 runs per intercomparison. Twenty-seven instruments were in at least one intercomparison, and five were in all four. Summarized results and all raw data are provided from the intercomparisons. Author

N82-11436*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
DIRECTIONAL FLOW SENSOR Patent Application
James M. Black, inventor (to NASA) Filed 7 Sep. 1981 13 p
(Contract NAS7-100)
(NASA-Case-FRC-11074-1; US-Patent-Appl-SN-291644) Avail: NTIS HC A02/MF A01 CSCL 14B

A bidirectional flow sensor comprises at least three axially aligned thermistors, each of which is connected in a normally balanced bridge circuit. The centermost thermistor serves as a heat source for fluid within a tubular body while thermal energy reversely is transferred between the outermost thermistors. Each bridge circuit includes an operational amplifier of a substantially common design with its reversing input connected to the first leg of the bridge circuit and its nonreversing input connected to the second leg. The first leg is characterized by series connected resistances and the thermistor of the roup for establishing a fixed voltage output ratio for the second leg. The output of voltage for the amplifier of each bridge circuit is indicative of the current required to maintain that temperature of the thermistor which is suitable for maintaining a constant voltage output ratio for the second leg of the bridge circuit. The output voltages of the pair of bridge circuits are applied to the inputs of another operational amplifier and provide for an output indicative of flow rate and direction for the fluid. NASA

N82-11437# R and D Associates, Marina Del Rey, Calif.
A GROUND-MOTION DISPLACEMENT GAUGE Topical Report, 5 Jan. - 1 Aug. 1980
Jack E. Whitener 1 Aug. 1980 52 p refs
(Contract DNA001-80-C-0069)
(AD-A104325; RDA-TR-113204-004; DNA-5574T) Avail: NTIS HC A04/MF A01 CSCL 14/2

This report describes a ground-motion displacement gauge and its applications. The gauge concept is based upon the free-fall time of a mass released inside a gauge cannister prior to the onset of ground motion. The time-of-fall of the mass to the cannister bottom during ground displacement, together with the free-fall time for the gauge at rest, uniquely determines the vertical displacement at one time. Simulation of ground displacement by gauge drop tests demonstrated the operating principle.
Author (GRA)

N82-11438# Northeastern Univ., Boston, Mass. Dept. of Electrical Engineering.
CONTROL AND DATA TRANSMISSION SYSTEM FOR A BALLOON-BORNE ION MASS SPECTROMETER
Raimundas Sukys and J. Spencer Rochefort Oct. 1980 9 p Presented at the Intern. Telemetering Conf., San Diego, Calif., 14-16 Oct. 1980
(Contract F19628-78-C-0218; AF Proj. 2310)
(AD-A104512; SCIENTIFIC-3; AFGL-TR-81-0202) Avail: NTIS HC A02/MF A01 CSCL 14/2

A control system for a balloon-borne ion mass spectrometer is described in this report. The system provides the ground based experimenter with a control flexibility approaching laboratory environment. A programmable PCM encoder is used for data transmission.
Author (GRA)

N82-11439# Los Alamos Scientific Lab., N. Mex.
COMPUTER MODELING OF AN ALL-SECONDARY EXPLOSIVE HOT-WIRE DEVICE
D. T. Varley, III Aug. 1981 28 p refs
(Contract W-7405-eng-36)
(DE81-030438; LA-8930-MS) Avail: NTIS HC A03/MF A01

An all-secondary explosive hot-wire device was modeled. The model accounts for the ignition of the explosive by electrical heating of a wire and the shearing of a flying plate that is subsequently used to detonate a second explosive. The results are in excellent agreement with experimental data. DOE

N82-11440# Sandia Labs., Albuquerque, N. Mex.
TRANSIENT TEMPERATURE RESPONSE OF STRAIN GAGES
P. H. Adams Aug. 1981 17 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031922; SAND-80-2689) Avail: NTIS HC A02/MF A01

The use of electrical resistance strain gages for the measurements of strain under transient temperature conditions presents the problem of determining the thermal output or apparent strain of the strain gage with sufficient accuracy to achieve satisfactory results. Various circuit temperature compensation techniques have been used by other investigators in the past, but little data are available relative to the accuracy of those techniques under transient temperature conditions. In particular, published data has been limited to temperature changes not exceeding 300 F per second. thermal response of one model of a high temperature weldable strain gage was determined for a temperature rise rate of 1000 F per second. DOE

N82-11441# Oak Ridge National Lab., Tenn. Barrier Technology Dept.
CALIBRATION OF A LAMINAR FLOWMETER: THE DATA AND CORRELATIONS
D. E. Fain May 1981 35 p ref Presented at the 2nd Intern. Symp. on Flow, St. Louis, 6 Apr. 1981
(Contract W-7405-eng-26)
(DE81-025227; K/ET-5013-Add-1; CONF-810434-5-Add-1) Avail: NTIS HC A03/MF A01

The experimental data employed for calibration of the laminar flowmeter, the regression analyses, and additonal graphic presentations are given. DOE

N82-11442# Oak Ridge National Lab., Tenn. Barrier Technology Dept.
CALIBRATION OF A LAMINAR FLOWMETER
D. E. Fain Jan. 1981 19 p refs Presented at the 2nd Intern. Symp. on Flow, St. Louis, 6 Apr. 1981
(Contract W-7405-eng-26)
(DE81-024423; K/ET-5013-Rev-1; CONF-810434-4-Rev-1) Avail: NTIS HC A02/MF A01

The parameters needed to describe the flow rate through a laminar flowmeter were investigated. Development of a laminar flow element standard is described, and a theory of laminar flowmeters based on the Poiseuille-Hagan law presented. Application of the theory to the laminar flow element standard is demonstrated. Better than 0.1% precision can be achieved, for short periods (days or longer) of less than six months. DOE

N82-11443# Wyoming Univ., Laramie. Water Resources Research Inst.
PERFORMANCE ASSESSMENTS OF PRECIPITATION GAGES FOR SNOW MEASUREMENT
Paul A. Rechard and Tsong C. Wei Sep. 1980 202 p refs Sponsored in part by Dept. of Commerce
(Contracts DI-14-31-0001-4051; DI-14-31-0001-5051)
(PB81-218547; SER-76; W81-03727; OWRT-A-015-WYO(3)) Avail: NTIS HC A10/MF A01 CSCL 08L

Shields used to reduce the effects of snow proprties, air turbulence, and gage configuration, and to improve the catch

performance of the gage are compared. In Hamon's proposed dual-gage approach was tested and the effects of wind speed and air temperature on the gage catch were analyzed. Precipitation measured by an Alter-sheilded gage in a forest opening was used as the standard catch. The catch by the Raised-Wyoming-sheilded gaga was found to be free from wind effects and to correlate well with the standard catch. Author

N82-11444# National Physical Research Lab., Pretoria (South Africa). Applied Spectroscopy Div.
GUIDE TO THE EVALUATION AND USE OF AN ATOMIC ABSORPTION SPECTROPHOTOMETER
R. J. Watling and I. M. vanMaarseveen May 1980 117 p refs
(PB81-222853; CSIR-SR-FIS-209; ISBN-0-7988-1904-9) Avail: NTIS HC A06/MF A01 CSCL 14B

A method for assessing the capabilities of an atomic absorption spectrophotometer is described. Topics covered include preparing standard solutons, selecting the integration period, choosing points A and B on calibration graphs, and the optimum working range. Results obtained for various elements are listed. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-11445 Cornell Univ., Ithaca, N. Y.
THEORETICAL INVESTIGATIONS INTO POSSIBLE X-RAY AND GAMMA-RAY LASERS Ph.D. Thesis
Daniel Michael Heffernan 1981 167 p
Avail: Univ. Microfilms Order No. 8119454

Problems which arise in obtaining lasing in a dense recombining plasma were examined. The proliferation of, and the effect on, the energy levels during atom-atom collisions was studied by modeling such collisions in one dimension. A gamma ray laser which utilizes induced two-proton decay of positronium in a positronium plasma was studied. A complete theory of lasing in a dense recombining plasma in three dimensions was developed and the conditions necessary for a population inversion were obtained in terms of experimentally controllable parameters. Dissert. Abstr.

N82-11446# Joint Publications Research Service, Arlington, Va.
CHINA REPORT: SCIENCE AND TECHNOLOGY, NO. 125
9 Sep. 1981 75 p refs Transl. into ENGLISH from various Chinese publications
(JPRS-78932) Avail: NTIS HC A04/MF A01

The characteristics of laser outputs are discussed. Focus is placed on pulse duration. Lasers of particlar interest include gas lasers, pulsed lasers, and metal vapor lasers. For individual titles, see N82-11447 through N82-11451.

N82-11447# Joint Publications Research Service, Arlington, Va.
THEORETICAL ANALYSIS OF EFFECT OF LANGMUIR FLOW IN RING LASER
Jiang Yanan, Qu Zhimin, Liu Songhao, and He Guang *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 1-16 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 1-8 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

The flow of gas in a gain medium is an important source of error in laser gyros. The drift of the frequency difference of opposite carrier waves brought about by the flow of active and nonactive atoms in the gain medium is discussed. The theoretical formula and the computed values of Langmuir flow in the third order theory are given. The use of statistical methods to treat the drift of frequency difference when a Gaussian beam passes through the gain field and the flow velocity field is emphasized. The computational formulas for various conditions are presented. T.M.

N82-11448# Joint Publications Research Service, Arlington, Va.
ANALYTICAL DESCRIPTION OF TIME CHARACTERISTICS OF HIGH POWER LASER PULSES
Yang Hanqian, Qu Zhimin, Liu Songhao, and He Guang-Sheng *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 17-25 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 9-13 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

The solution of the time parameters of high power laser pulses is presented. The mathematical relationship of the time a pulse is established is given. The effects of the section of the active medium upon the time a pulse is established, the single pulse condition, and the pulse width are discussed. T.M.

N82-11449# Joint Publications Research Service, Arlington, Va.
STRUCTURAL, OUTPUT CHARACTERISTICS OF PULSED XENON ION LASER
Wang Yuzhi, Xie Peiliang, Dong Jing-xing, and Feng Bingfang *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 26-34 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 18-21 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

The peak power of the laser is 150 watts. The oscillating spectral lines are found in the 4300 to 6300 angstrom range, and the pulse width of the laser is 0.2 to 1 microsecond. The discharge voltage is 4 to 12 kilovolts, and the gas pressure is 0.1 to 9 millitorr. T.M.

N82-11450# Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF PULSE GOLD VAPOR LASER OUTLINED
In its China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 35-37 ref Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 45-46 (For primary document see N82-11446 02-36)
Avail: NTIS HC A04/MF A01

Several dozen laser oscillating spectra lines were found within the very broad spectral wavelengths from infrared to ultraviolet. Laser studies of gold vapor were carried out and a pulsed laser of gold atoms of an operating wavelength of 6278 angstroms was obtained. T.M.

N82-11451# Joint Publications Research Service, Arlington, Va.
LASER TRIGGERED SPARK GAPS UNDER EXPERIMENTAL STUDY
Meng Shaoxian, Pu Chaoshun, Yang Yi, Sun Naigeng, and Xie Ziming *In its* China Rept.: Sci. and Technol., No. 125 (JPRS-78932) 9 Sep. 1981 p 38-44 refs Transl. into ENGLISH from Jiguang (China), v. 8, no. 4, Apr. 1981 p 46-47 (For primary document see N82-11446 02-36)
Avail: NTIS

Laser triggered spark gaps are an important component for the selection of singular ultrashort pulses from the locked mode pulsed laser and for shearing of laser waveforms by the photoelectric switch. The copper sphere gap was examined. It consists of two copper sphers. The multiple voltage rectified high voltage is passed through a 75 ohm electrical cable which is connected to the spheres. When the locked mode laser passes through the short focal distance lens and focuses on the gap between the copper spheres, an air puncture is formed producing initial electrons and ions. These electrons and ions move towards the two electrodes under the effects of the electrical field of the gap between the spheres, thus forming a puncture in the gap between the spheres. The discharge waveform in the gap between the spheres was measured. T.M.

N82-11452*# RCA Labs., Princeton, N. J.
InGaAsP/InP LASER DEVELOPMENT FOR SINGLE-MODE, HIGH-DATA-RATE COMMUNICATIONS Interim Report, 1 Jul. 1980 - 31 Mar. 1981
I. Ladany, E. R. Levin, C. W. Magee, and R. T. Smith Nov. 1981 59 p refs
(Contract NAS1-15962)

(NASA-CR-3477; PRRL-81-CR-12) Avail: NTIS HC A04/MF A01 CSCL 20E

Materials studies as well as general and specific device development were carried out in the InGaAsP system. A comparison was made of three standard methods of evaluating substrate quality by means of dislocation studies. A cause of reduced yield of good wafers, the pullover of melt from one bin to the next, has been analyzed. Difficulties with reproducible zinc acceptor dnping have been traced to segregation of zinc in the In/Zn alloy used for the doping source. Using EBIC measurments, the pn junction was shown to drift in location depending on factors not always under control. An analysis of contact structures by SIMS showed that the depth to which the sintered Au/Zn contact penetrates into the structure is typically 0.13 microns, or well within the cap layer and out of the p-type cladding and thus not deleterious to laser prformance. The problem of single-mode laser development was investigated and it was shown to be related to the growth habit over four different possible substrate configurations. The fabrication of constricted double heterojunctions, mesa stripe buried heterostructures, and buried heterostructures was discussed, and measurements were presented on the device properties of single-mode buried heterostructure lasers. Results include single spectral line emission at 3 mW and a threshold current of 60 mA. B.W.

N82-11453*# Perkin-Elmer Corp., Danbury, Conn.
DEVELOPMENT OF MBE GROWN PB-SALT SEMICONDUCTOR LASERS FOR THE 8.0 TO 15.0 MICROMETER SPECTRAL REGION
Matthew D. Miller Mar. 1981 77 p refs
(Contract NAS1-14996)
(NASA-CR-165683) Avail: NTIS HC A05/MF A01 CSCL 20E

Diodes lasers are fibricated using multiple source molecular beam expitaxial growth of (PbSn)Te on BaF2 substrates. Methods for crystal growth, crystal transfer, and device fabrication by photolithographic techniques were developed. The lasers operate in the spectra range from 10 microns to 14 microns and at temperatures from 12K to 60K continuous wave and to 95 K pulsed. S.L.

N82-11454# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Plasma Physics Lab.
MASS SPECTROMETRY OF THE CO2 LASER PLASMA Final Report, Jul. 1975 - Sep. 1979
David E. Toodle Jun. 1981 74 p refs
(AF Proj. 2301)
(AD-A104344; AFWAL-TR-80-2029) Avail: NTIS HC A04/MF A01 CSCL 20/5

The neutral and ion chemistry of the CO2 laser mixture have been studied in detail by using a quadrupole mass spectrometer and a theoretical model. Experimentally, CO2 is observed to dissociate primarily by direct electron impact producing the dominant neutral species CO and O2. Little or no N2 dissociation occurs in a N2/Ar discharge; however, the dissociation of N2 increases when it is added to a mixture containing CO2. Consequently, the dominant nitrogen oxide in discharges containing CO2 and N2 is NO. The major positive ions are CO2(+), O2(+), CO(+), and N2(+); and the major negative ions are NO2(-), NO3(-), O2(-), O(-)and, CO3(-). CO2 dissociation is reduced by as much as 20% at a discharge current of 80mA with the addition of 2% H2. Techniques for using a mass spectrometer to sample from glow discharges are also discussed. Author (GRA)

N82-11455# Singer Co., Binghamton, N.Y.
RELIABILITY AND MAINTAINABILITY ASSESSMENT REPORT FOR LASER SCANNER IMAGE GENERATION SYSTEM, REVISION A Final Report
M. Edmondson 15 Jan. 1981 144 p
(Contract N61339-74-C-0039; DA Proj. 1F4-64204-D-275)
(AD-A104239; LR-1029-Rev-A) Avail: NTIS HC A07/MF A01 CSCL 14/5

This document sets forth the procedures, criteria and conclusions associated with the reliability and maintainability assessment for the Laser Scanner Image Generation System (LSIG). The objective of the 12 day assessment was to evaluate the reliability/maintainability potential of the LSIG, specifically with regard to operational availability. Data accrued on the breadboard system concerning those design characteristics influencing operational availability - reliability, stability, and maintainability - was to be combined with data from operation during the development period and vendor data to accomplish this objective. To the extent possible, parametric estimates were to be developed and compared to the design goals of the Link S.O.W. GRA

N82-11456# Defence Research Establishment Valcartier (Quebec).
DETERMINATION OF PULSED CO2 LASER DAMAGE THRESHOLDS OF OPTICAL SURFACES
J. C. Anctil and R. W. MacPherson Mar. 1981 45 p refs
(AD-A104424; DREV-R-4197/81) Avail: NTIS HC A03/MF A01 CSCL 20/6

An experimental technique is described for determining the damage thresholds of glass and plastic optical material surfaces, opaque to laser radiations, when irradiated with a pulsed TEA-CO2 laser. Use of a probit analysis to estimate the irradiance required for a 50% probability of damage gives threshold levels of 4.0 J/(sq cm) for fused silica, 2.1 J/(sq cm) for soda-lime glass, 2.3 J/(sq cm) for polycarbonate, 2.3 J/(sq cm) for acrylic and 1.7 J/(sq cm) for polystyrene plastics. The significance of the statistical distributions observed in attributing various mechanisms to the damage is discussed. Finally, some improvements are suggested to make the measurements more accurate.
Author (GRA)

N82-11457# Boeing Co., Seattle, Wash.
PULSED DF LASER EFFECTS STUDY Final Report
R. B. Hall, W. E. Maher, and D. B. Nichols Jul. 1981 106 p refs
(Contract F29601-79-C-0003; AF Proj. 3326)
(AD-A104575; AFWL-TR-80-104) Avail: NTIS HC A06/MF A01 CSCL 20/5

This study of DF laser interaction with materials investigated the amount of energy coupled to targets. Large focal spot dimensions were obtained with the Boeing photo-initiated 50-1 pulsed chemical laser with a stable resonator. Effects experiments emphasized metallic targets, especially aluminum. The single pulse coupling results yielded absorbed fluence values greater than those obtained with comparable energies at 10.6 micrometer wavelength. Ambient pressure and angle of incidence were varied. Research results also showed multiple-pulse effect at DF wavelength. Multiple-pulse thermal coupling experiments with aluminum demonstrated that, after 10 shots on the same spot, the coupled fluence per pulse doubled. Because of target melting and vaporization, both the intrinsic absorptivity and the plasma enhanced coupled fluence of succeeding pulses is greatly increased. In general, the multiple pulse effect is intensity-dependent and is small at either low or high intensities. Energy deposition was tested for uniformity by measuring the rises in temperature at five locations within the focal spot with an array of thermocouples. GRA

N82-11458# Avco-Everett Research Lab., Mass.
CONCEPTUAL DESIGN OF AN ANGULAR MULTIPLEXED RARE GAS HALIDE LASER FUSION DRIVER Final Technical Report, 1 Aug. 1979 - 31 May 1980
Joel H. Parks Nov. 1980 338 p refs
(Contract DE-AC08-79DP-40113)
(DE81-029900; DOE/DP-40113/1) Avail: NTIS HC A15/MF A01

A conceptual definition for angular multiplexed rare gas halide drivers was formulated and several design examples analyzed. Angular multiplexed rare gas halide lasers can be designed to meet inertial confinement fusion requirements. These lasers are scalable, emit at short wavelengths (KiF 250 nm), and through the use of optical angular multiplexing, produce the required high energy (approx. 1 to 5 MJ) in a short plse (approx. 10 nsec) with projected overall efficiency in the range of 5 to 7%. DOE

N82-11459# McElroy (Ralph) Co., Austin, Tex.
REPORT OF LASER ACTIVITIES: 1978 - 1979
B. Sitt, E. Berthier, E. Buresi, and N. Wilke 1981 11 p refs
Transl. into ENGLISH from Comm. de l'Energie Atomique, Villeneuve-St.-Georges, France, Sep. 1980 Prepared for Los

Alamos National Lab., N. Mex.
(Contract W-7405-eng-36)
(DE81-028997; LA-tr-81-22) Avail: NTIS HC A02/MF A01

The Lagrangian model of perturbation was extended to the magnetohydrodynamic case to permit study of the growth of spontaneous magnetic fields. Emphasis was placed on hydrodynamic instabilities on the implosion of targets. DOE

N82-11460# California Univ., Livermore. Lawrence Livermore Lab.
LASERS IN MATERIALS PROCESSING
J. I. Davis and E. B. Rockower 1981 44 p refs Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10-12 Jun. 1981
(Contract W-7405-eng-48)
(DE81-027657; UCRL-85175-Rev-1; CONF-810613-10-Rev-1) Avail: NTIS HC A03/MF A01

A status report on the uranium Laser Isotope Separation (LIS) Program is presented. Process economic analysis is presented so as to understand how the unique properties of laser photons can be best utilized in the production of materials and components despite the high cost of laser energy. The characteristics of potential applications that are necessary for success are identified, and those factors that have up to now frustrated attempts to find commercially viable laser induced chemical and physical process for the production of new or existing materials are pointed out. DOE

N82-11461# Los Alamos Scientific Lab., N. Mex. Applied Theoretical Physics Div.
TWO-DIMENSIONAL THEORY AND SIMULATION OF FREE ELECTRON LASERS
Thomas J. T. Kwan and John R. Cary 1981 9 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29-30 Jun. 1981
(DE81-025365; LA-UR-81-1936; CONF-7405-eng-36) Avail: NTIS HC A02/MF A01

Two-dimensional homogeneous theory of free-electron lasers with a wiggler magnetic field of constrant wavelength was formulated. It was found that waves propagating obliquely with respect to the electron beam are always unstable with appreciable growth rates; therefore, mode competition among the on-axis and off-six modes is an important consideration in the design of the free-electron laser. Furthermore, electromagnetic waves with group velocities opposite to the direction of electron beam propagation are absoulutely unstable if k sub o, v sub o omega sub pe (1/gammace/2) + 1/gamma (1/2). Due to long nonlinear saturation levels of the low frequency absolute instability, the dynamics of the electron beam, and the generation of the high frequency electromagnetic radiation can be severely affected. Two-dimensional particle simulations show that efficiency of genration of the on-axis high-frequency of the off-axis modes. In addition, complete disruption of the electron beam and laser oscillation due to the onset of the absolute instability were observed in simulations. DOE

N82-11462# Princeton Univ., N. J. Plasma Physics Lab.
MAGNETO-OPTICALLY MODULATED CH3OH LASER FOR FARADAY ROTATION MEASUREMENTS IN TOKAMAKS
D. K. Mansfield and L. C. Johnston Jul. 1981 20 p refs
(Contract DE-AM02-76CH-03073)
(DE81-027298; PPPL-1801) Avail: NTIS HC A02/MF A01

Distortion-free intracavity polarization modulation of an optically pumped CH3OH laser is shown to be viable. The possible use of this modulation technique to make a multichannel Faraday rotation measurement on a Tokamak device is discussed. In addition, the CdTe Faraday modulator employed in this tudy is shown to have an anomalously large Verdet constant. DOE

N82-11463# Sandia Labs., Albuquerque, N. Mex.
STIMULATED RAMAN STUDIES OF CO2-LASER-EXCITED SF6
P. Esherick, A. Jay Grimley, and Adelbert Wyoung 1981 8 p refs Presented at the Intern. Conf. on Laser Spectroscopy, Alberta, Canada, 29 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025829; SAND-81-1589C) Avail: NTIS HC A02/MF A01

The use of Stimulated Raman Spectroscopy (SRS) for high resolution studies of transient species is reported. Specifically, SF6 molecules excited by a CO2 laser are used as a prototypical system for examining these capabilities. Stimulated Raman techniques are used to the desired spectral region with high temporal and spectral resolving power. The preliminary results reported demonstrate the applicability of SRS techniques to studying the dynamics of multi-photon excitation processes in molecular systems. These experiments illustrate the potential capability for obtaining time resolved spectral information with SRS, and may lead the way to eventual Raman probing of molecular photogragments or other transient species. DOE

N82-11294*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TRAVELING-WAVE MASER, CLOSED CYCLE REFRIGERATOR AUTOMATION
J. A. McNeil (Loyola Marymount Univ., Los Angeles) and S. M. Petty *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 99-103 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

N82-11297*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN ERROR BUDGET FOR THE JPL HYDROGEN MASER RECEIVER
C. A. Greenhall *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 118-126 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 20E

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-11464# South African Bureau of Standards, Pretoria.
STANDARD SPECIFICATION FOR AIR-BRAKE RESERVOIRS
5 Nov. 1980 17 p In ENGLISH and AFRIKAANS
(SABS-1312-1980; ISBN-0-626-05679-9; GR-8) Avail: NTIS HC A02/MF A01

This specification covers the requirements for air-brake reservoirs of the single-compartment or the multi-compartment type, that have in both cases a capacity in the range 5-100 pounds and a maximum working pressure not exceeding 2,000 kPa. These reservoirs are not to be used for applications where the Factories, Machinery and Building Work Act or Mines and Works Act applies. T.M.

N82-11465*# Rocketdyne, Canoga Park, Calif.
ADVANCED SUPERPOSITION METHODS FOR HIGH SPEED TURBOPUMP VIBRATION ANALYSIS Interim Report
C. E. Nielson and A. D. Campany 19 May 1981 96 p refs (Contract NAS3-22480)
(NASA-CR-165379; RI/RD81-149) Avail: NTIS HC A05/MF A01 CSCL 13I

The small, high pressure Mark 48 liquid hydrogen turbopump was analyzed and dynamically tested to determine the cause of high speed vibration at an operating speed of 92,400 rpm. This approaches the design point operating speed of 95,000 rpm. The initial dynamic analysis in the design stage and subsequent further analysis of the rotor only dynamics failed to predict the vibration characteristics found during testing. An advanced procedure for dynamics analysis was used in this investigation. The procedure involves developing accurate dynamic models of the rotor assembly and casing assembly by finite element analysis. The dynamically instrumented assemblies are independently rap tested to verify the analytical models. The verified models are then combined by modal superposition techniques to develop a completed turbopump model where dynamic characteristics are determined. The results of the dynamic testing and analysis obtained are presented and methods of moving the high speed vibration characteristics to speeds above the operating range are recommended. Recommendations for use of these advanced

dynamic analysis procedures during initial design phases are given. Author

N82-11466*# Mechanical Technology, Inc., Latham, N. Y.
PRELIMINARY STUDY OF TEMPERATURE MEASUREMENT TECHNIQUES FOR STIRLING ENGINE RECIPROCATING SEALS Final Report
Donald F. Wilcock, Leo Hoogenboom, Maarten Meinders, and Ward O. Winer Aug. 1981 82 p Prepared in cooperation with Georgia Inst. of Tech.
(Contracts DEN3-227; DE-AI01-77CS-51040)
(NASA-CR-165479; DOE/NASA/0227-1; MTI82-TR-4) Avail: NTIS HC A05/MF A01 CSCL 11A

Methods of determining the contact surface temperature in reciprocating seals are investigated. Direct infrared measurement of surface temperatures of a rod exiting a loaded cap seal or simulated seal are compared with surface thermocouple measurements. Significant cooling of the surface requires several milliseconds so that exit temperatures may be considered representative of internal contact temperatures. S.L.

N82-11467*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
JT8D HIGH PRESSURE COMPRESSOR PERFORMANCE IMPROVEMENT Progress Report, Sep. 1978 - Apr. 1981
W. O. Gaffin 11 Nov. 1981 47 p ref
(Contract NAS3-20630)
(NASA-CR-165531; PWA-5515-162) Avail: NTIS HC A03/MF A01 CSCL 13I

An improved performance high pressure compressor with potential application to all models of the JT8D engine was designed. The concept consisted of a trenched abradable rubstrip which mates with the blade tips for each of the even rotor stages. This feature allows tip clearances to be set so blade tips run at or near the optimum radius relative to the flowpath wall, without the danger of damaging the blades during transients and maneuvers. The improved compressor demonstrated thrust specific fuel consumption and exhaust gas temperature improvements of 1.0 percent and at least 10 C over the takeoff and climb power range at sea level static conditions, compared to a bill-of-material high pressure compressor. Surge margin also improved 4 percentage points over the high power operating range. A thrust specific fuel consumption improvement of 0.7 percent at typical cruise conditions was calculated based on the sea level test results. B.W.

N82-11468*# Rocketdyne, Canoga Park, Calif.
LIQUID OXYGEN TURBOPUMP TECHNOLOGY Final Report
C. E. Nielson Nov. 1981 252 p refs
(Contract NAS3-21356)
(NASA-CR-165487; RI/RD81-199) Avail: NTIS HC A12/MF A01 CSCL 13I

A small, high-pressure, LOX turbopump was designed, fabricated and tested. The pump is a single-stage centrifugal type with power to the pump supplied by a single-stage partial-admission axial-impulse turbine. Design conditions included an operating speed of 7330 rad/s (70,000 rpm), pump discharge pressure of 2977 N/sqcm (4318 psia), and a pump flowrate of 16.4 Kg/s (36.21 lb/s). The turbopump contains a self-compensating axial thrust balance piston to eliminate axial thrust loads on the bearings during steady-state operation. Testing of the turbopump was achieved usng a gaseous hydrogen high-pressure flow to drive the turbine, which generally is propolled by LOX/LH2 combustion products, at 1041K (1874 R) inlet temperature and at a design pressure ratio of 1.424. Test data obtained with the turbopump are presented which include head-flow-efficiency performance, suction performance, balance piston performance and LOX seal performance. Mechanical performance of the turbopump is also discussed. Author

N82-11469*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SCRIBER FOR SILICON WAFERS Patent Application
Kazuo A. Yamakawa (JPL, California Inst. of Technology, Pasadena) and Edward P. Fortier, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Filed 18 Sep. 1981 17 p
(Contract NAS7-100)
(NASA-Case-NPO-15539-1; US-Patent-Appl-SN-303670) Avail: NTIS HC A02/MF A01 CSCL 13I

A device for dividing silicon wafers into rectangular chips is characterized by a base including a horizontally oriented bed with a planar support surface, a vacuum chuck adapted to capture a silicon wafer seated on the support for translation in mutually perpendicular directions. A stylus support mounted on the bed includes a shaft disposed above and extended across the bed and a truck mounted on the shaft and supported thereby for linear translation along a path extended across the bed a vertically oriented scribe has a diamond tip supported by the truck also adapted as to engage a silicon wafer captured by the chuck and positioned beneath it in order to form score lines in the surface of the wafer as linear translation is imparted to the truck. A chuck positioning means is mounted on the base and is connected to the chuck for positioning the chuck relative to the stylus. NASA

N82-11470*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CLAMP-MOUNT DEVICE Patent Application
Keith H. Clark, inventor (to NASA) Filed 14 Aug. 1981 10 p
(NASA-Case-MFS-25510-1; US-Patent-Appl-SN-293414) Avail: NTIS HC A02/MF A01 CSCL 13I

Equipment can be mounted to an associated I-beam and the like structural member of the type having oppositely extending flanges using a clamp-mount device which comprises a base and a pair of oppositely facing clamping members carried diagonally on the base clamping flanges. Flanges receiving openings facing one another. Lock means are carried diagonally by the base opposite the clamping members to locking the flanges in the clamping members. A resilient hub is carried centrally of the base engaging and biasing a back side of the flanges maintaining same tightly clamped and facilitating use on vertical as well as horizontal members. The base turns about the hub to receive the flanges within the clamping members. Slidable gate latches secure the hinged locks in an upright locking position. The resilient hub includes a recess opening in the base in which a rubber-like pad is depressably and rotatably carried. NASA

N82-11471# Battelle Columbus Labs., Ohio.
THERMAL AND CHEMICAL EFFECTS IN HIGH PRESSURE ROLLING/SLIDING CONTACTS Final Report
J. W. Brasch, E. J. Druglis, R. J. Jakobsen, T. A. Dow, R. D. Stockwell, and J. W. Kannel 14 Sep. 1981 23 p refs
(Contract N00014-79-C-0241)
(AD-A104473; BATT-G7308-F) Avail: NTIS HC A02/MF A01 CSCL 20/11

In a previous report to the Office of Naval Research, several thermal and thermomechanical aspects of tribology pertinent to rolling/sliding contacts were described in some detail. In this final report, there is presented an account of related work on surface chemical reactions occurring at high pressures. A model lubricant system - lauric acid in dodecane - in contact with a simulated bearing surface - thin films of vacuum-deposited iron - was employed in these studies. Fourier transform infrared spectroscopy was used to detect the formation of species arising from chemical reactions occurring between the acid molecules and the substrate. Details of the experimental technique and its application to the present program are given. Author (GRA)

N82-11472# Naval Research Lab., Washington, D. C.
QUIET BEARING SURFACE CHARACTERIZATION Memorandum Report, 1 Oct. 1980 - 1 Aug. 1981
R. A. Jeffries, H. Ravner, and I. L. Singer 17 Sep. 1981 13 p refs
(AD-A104412; NRL-4625) Avail: NTIS HC A02/MF A01 CSCL 13/9

Surface chemical and topographical features of bearings which passed or failed Anderometer noise testing were correlated with their noise characteristics. No surface chemical differences existed between noisy or quiet bearings. The former did, however, exhibit bands of circular scratches on 'polar' ends of ball surfaces with an equatorially located narrow 'frost' band consisting of small (2-5 micrometers in diameter) pits of the type associated with contact fatigue. Quiet bearings also possessed frost bands which were always wider and sometimes multiple but did not possess

the bands of scratches. The ability of the balls in a noisy bearing to roll freely are believed to be hindered; the resulting increase in contact-Hertz loads and sliding frictional forces result in the generation of noise. Interim solutions to the problem are also discussed. Author (GRA)

N82-11473# Kanner (Leo) Associates, Redwood City, Calif.
MAGNETIC BEARINGS
I. Yasuda 1981 10 p Transl. into ENGLISH of Japanese Patent No. 125544-1978 (1 Nov., 1978, Patent Appl. No. 40294-1977) Prepared for LASL, N. Mex.
(Contract W-7405-eng-36)
(DE81-024201; LA-Tr-81-19) Avail: NTIS HC A02/MF A01

The design and operation of a magnetic bearing are described. Noncontacting bearings with concentric cylindrical parts formed on rotating bodies and stationary bodies are discussed. The enhancement of the dampening effect for suppressing vibrations is emphasized. DOE

N82-11474# California Univ., Berkeley. Lawrence Berkeley Lab.
NOVEL DESIGN OF PRESSURE VESSELS AND THERMAL SHIELDS IN COAL GASIFIERS
B. W. Loo Jun. 1981 11 p refs Presented at the Symp. on Instr. and Control for Fossil Energy Processes, San Francisco, 7-10 Jun. 1981
(Contract W-7405-eng-48)
(DE81-025828; LBL-12807) Avail: NTIS HC A02/MF A01

Two outstanding problems in commercial sized coal gasifiers, namely, detecting and locating any deterioration in the refractory thermal barrier and the construction of a safe pressure vessel utilizing advanced carbon fiber composite technology are described. Design considerations are given for a typical gasifier some 30 feet in diameter by 150 feet tall with a maximum internal temperature and pressure of 2500 F and 1500 psi respectively. A system of computer controlled cooling circuits is deployed between the refractory barrier and the external lightweight pressure vessel. Multiple levels of redundancy are built in to guard against any component failure. Through the sensing of coolant temperature and the modulation of coolant flow, a map of heat flux distribution over the gasifier wall may be generated with a spatial resolution of about 5 feet. Results indicate that the coolant temperature rise can be maintained by no more than 90 F with only a modest amount of coolant flow. DOE

N82-11475# Bendix Corp., Kansas City, Mo.
TOOLING FOR ELECTROCHEMICAL DEBURRING
W. M. Moore Aug. 1981 59 p refs
(Contract DE-AC04-76DP-00613)
(DE81-030190; BDX-613-2644) Avail: NTIS HC A04/MF A01

The design and construction of electrochemical deburring tools were analyzed. Specific areas discussed are: tooling limitations, process limitations, characteristics of the electrode, insulation of critical areas, and basic concepts for preventing tooling problems. Forty applicatons on precision miniature mechanism components are discussed. DOE

N82-11476# Oak Ridge Y-12 Plant, Tenn. Fabrication Systems Dept.
DIGITAL CONTROL OF MACHINE TOOLS
R. R. Burleson Aug. 1981 30 p refs
(Contract W-7405-eng-26)
(DE81-029950; Y-2227) Avail: NTIS Hc A03/MF A01

The microcomputer is ideally suited for position-loop calculations and also to replace conventional control equipment. An evolution from the standard numerical-control positioning loop to a system of networked microprocessors is discussed. DOE

N82-11477# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.
AN EVALUATION OF THREE-WAY CONTROL SINGLE AND DUAL BED CATALYSTS AS APPLIED TO HEAVY-DUTY GASOLINE ENGINES
Thomas Nugent Apr. 1981 30 p refs
(PB81-224982; EPA-AA-SDSB-81-4) Avail: NTIS HC A03/MF A01 CSCL 21G

A test program to evaluate the applicability of three-way control (TWC) and dual-bed catalysts (TWC and Oxidation Catalysts) in combination with a closed-loop control stoichiometric (feedback) carburetor on a production 1978 IHC 404 CID heavy duty gasoline engine was conducted. Testing was conducted according to the Federal test procedure for the heavy-duty transient cycle. The test program consisted of forty-six cold-start tests, fifty-eight confimatory hot-start tests run to insure accuracy and precision of the cold-start tests, and fourteen hot-start tests run to identify the effects of air/fuel ratio control points on NOx emissions. The effects of various combinations of catalysts, EGR, air/fuel control points, carburetor response times and air pump capacity on emissions, fuel economy and engine power were examined. GRA

N82-11478# AiResearch Mfg. Co., Torrance, Calif.
BRAYTON/RANKINE 10-TON GAS-FIRED SPACE CONDITIONING SYSTEM, PHASE 2 Annual Report
16 Mar. 1981 103 p refs
(Contracts GRI-5014-341-0114; W-7405-eng-26)
(PB81-223372; GRI-80/0053; ATR-1) Avail: NTIS HC A06/MF A01 CSCL 13I

The heat-actuated space conditioning system provides moe efficient use of natural gas and is intended as an all-gas alternative to the electric heat pump. The system employs a subatmospheric natural-gas-fired heat pump. A centrifugal R-12 refrigerant compressor is driven directly from the Brayton engine rotating group through a hermetically sealed coupling. Unique features that offer high life-cycle performance include a permanent magnet coupling, foil bearings, and atmospheric in-line combustor, and a high-temperature recuperator. Predicted overall engine efficiency is 27 percent and predicted overall coefficient of performane (COP) at the energy source is 1.0 in cooling and 1.2 to 1.4 in heating. GRA

N82-11479# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobile Source Air Pollution Control.
EPA EVALUATION OF THE FUEL-MAX DEVICE UNDER SECTION 511 OF THE MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT
Edward Anthony Barth Jun. 1981 140 p
(PB81-229866; EPA-AA-TEB-511-81-10A; EPA-AA-TEB-511-81-10B) Avail: NTIS HC A07/MF A01 CSCL 13F

The 'FUEL-MAX' device is an air bleed device that replaces the EGR valve. It is claimed to conserve fuel. The purpose of the EGR system is to control oxides of nitrogen (NOx). Removal of the EGR valve to install the 'FUEL-MAX' disables the EGR system and would be expected to result in a large increase in NOx emissions. Test data submitted by the applicant confirmed this prediction as well as indicating that 'FUEL-MAX' might improve fuel economy. Although the data did no adequately quatify the amount of this improvement, EPA chose to conduct confirmatory testing. GRA

N82-11480# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
EPA EVALUATION OF THE AUTOMOTIVE CYLINDER DEACTIVATOR SYSTEM (ACDS) UNDER SECTION 511 OF THE MOTOR VEHICLE INFORMATION AND COST SAVING ACT
Edward Anthony Barth May 1981 99 p
(PB81-228256; EPA-AA-TEB-511-81-7) Avail: NTIS HC A05/MF A01 CSCL 13F

The conclusions of the evaluation of the automotive cylinder deactivator sytem device under provisions of Section 511 of the Motor Vehicle Information and Cost Savings Act are announced. This device is designed to deactivate engine cylinders as a means of increasing a vehicle's fuel economy. GRA

N82-11301*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REHABILITATION OF 64-METER-ANTENNA RADIAL BEARING
H. McGinness and G. Gale *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 151-161 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 13I

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-11481# Cornell Univ., Ithaca, N. Y. Dept. of Structural Engineering.
EDDY CURRENT FLOWS AROUND CRACKS IN THIN PLATES FOR NONDESTRUCTIVE TESTING Topical Report, Aug. 1980 - Mar. 1981
S. Mukherjee, M. A. Morjaria, and Francis C. Moon 1 Mar. 1981 40 p refs
(Contract N00014-79-C-0224)
(AD-A104407) Avail: NTIS HC A03/MF A01 CSCL 20/3

The boundary element method is used to calculate the induced electric current flow around cracks in thin conducting plates. A low frequency approximation leads to a Poisson equation for the current density potential or stream function. A kernel is used which produces the correct singularity at the crack tip. The boundary condition on the crack, derived from Faraday's law, requires the line integral of the current density around the crack to be zero. Numerical results for induced currents due to a circular induction coil are given. These results show that hot spots, due to Joule heating, can occur at the tips of the crack. Comparison of numerical results with infrared scanning experiments of eddy currents in a cracked plate are given. It is hoped that the numerical method presented here will provide a tool to simulate both new and conventional nondestructive eddy current testing techniques. GRA

N82-11482# Wisconsin Univ. - Madison. Dept. of Statistics.
RECENT ADVANCES IN STATISTICAL METHODS FOR SYSTEM RELIABILITY USING BERNOULLI SAMPLING OF COMPONENTS
Bernard Harris and Andrew P. Soms, (Wisconsin Univ., Milwaukee) Jul. 1981 13 p refs
(Contract N00014-79-C-0321; DAAG29-80-C-0041)
(AD-A104436; TR-643) Avail: NTIS HC A02/MF A01 CSCL 12/1

The paper provides a survey of results in statistical inference in systems reliability using Bernoulli sampling of individual components. Particular attention is given to the notion of Buehler optimally and its implementation in such problems. Recent results of the authors on Buehler optimal confidence bounds on the reliability of series and parallel systems are discussed. For series systems, these results employ a generalization of an inequality of Sudakov. For parallel systems, Buehler optimal bounds are obtained for small numbers of failures using the notion of Schur concavity. Estimates of the optimal bounds are obtained in those cases for which the property of Schur concavity does not hold. Author (GRA)

N82-11483# Stanford Univ., Calif. Dept. of Statistics.
FEASIBLE OBJECTIVE CONFIDENCE BOUNDS FOR SYSTEM RELIABILITY
M. Vernon Johns, Jr. 20 Aug. 1981 50 p refs
(Contract DAAG29-79-C-0166)
(AD-A104260; TR-6; ARO-16668.4-M) Avail: NTIS HC A03/MF A01 CSCL 12/1

The basic problem of determining objective (frequentistic) confidence bounds for the reliability of a series system based on failure data from tests of the independent components is addressed. The notion of confidence bounds based on orderings imposed on the sample space is exploited, and certain optimality considerations are incorporated. Advantage is taken of the simplifications resulting from the use of the Poisson approximation for data from highly reliable components. Tables of exact confidence bounds are produced for the case of two-component systems. GRA

N82-11484# Little (Arthur D.), Inc., Cambridge, Mass.
RESEARCH AND DEVELOPMENT OF METHODS FOR ESTIMATING PHYSICOCHEMICAL PROPERTIES OF ORGANIC COMPOUNDS OF ENVIRONMENTAL CONCERN, PART 1, PHASE 2 Final Report, May 1979 - Jun. 1981
James D. Birkett, ed., Sara E. Bysshe, Cathy E. Campbell, Clark Grain, John H. Hagopian, Judith C. Harris, Michael J. Hayes, Leslie H. Nelken, Carl E. Rechsteiner, Jr. et al Jun. 1981 485 p refs 2 vol
(Contract DAMD17-78-C-8073; DA Proj. 3E1-62720-A-835) (AD-A104552; ADL-C-82426-Pt-1) Avail: NTIS HC A21/MF A01 CSCL 07/4

Selected, evaluated estimation methods are presented for 10 environmentally important physicochemical properties of organic chemicals. The methods selected are applicable to a variety of chemical classes, are easy to use, require a minimum of input data, and are reasonably accurate. Each method has a descriptive text, step-by-step instructions, worked-out examples, and supplementary information allowing the user to estimate the likely uncerinty of an estimated value. Topics covered include octanol/water partition coefficient; solubility in water; solubility in various solvents; adsorption coefficient for soils and sediments; bioconcentration factor in aquatic organisms; acid dissociation constant; rate of hydrolysis; rate of aqueous photolysis; rate of biodegradation; and atmospheric residence time. Since the rates of aqueous photolysis and of biodegradation cannot be estimated, only qualitative or semiquantitative information is provided for these. GRA

N82-11485# Little (Arthur D.), Inc., Cambridge, Mass.
RESEARCH AND DEVELOPMENT OF METHODS FOR ESTIMATING PHYSICOCHEMICAL PROPERTIES OF ORGANIC COMPOUNDS OF ENVIRONMENTAL CONCERN, PART 2, PHASE 2 Final Report, May 1979 - Jun. 1981
Warren J. Lyman, ed., James D. Birkett, Sara E. Bysshe, Cathy E. Campbell, Clark Grain, John H. Hagopian, Judith C. Harris, Michael J. Hayes, Leslie H. Nelken, Carl E. Rechsteiner, Jr. et al Jun. 1981 510 p refs 2 Vol.
(Contract DAMD17-78-C-8073; DA Proj. 3E1-62720-A-835) (AD-A104553; ADL-C-82426-Pt-2) Avail: NTIS HC A22/MF A01 CSCL 07/4

Instructions are given for estimating: (1) activity coefficient; (2) boiling point; (3) heat of vaporization; (4) vapor pressure; (5) volatilization from water; (6) volatilization from soil; (7) diffusion coefficients in air and water; (8) flash points of pure substances; (9) densities of vapors, liquids and solids; (10) surface tension; (11) interfacial tension with water; (12) liquid viscosity; (13) heat capacity; (14) thermal conductivity; (15) dipole moment; and (16) index of refraction. A bibliography of standard chemical property data sources is appended. Simple linear regression and evaluating propagated and total error in chemical property estimates are discussed. Recommendations for future research and development are included. GRA

N82-11296*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MINIMIZING THE TIME TO TROUBLESHOOT A FAILED SYSTEM
E. J. Subelman (California Univ., Los Angeles) *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 113-117 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 14D

N82-11302*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE QUALITY ASSURANCE ROLE IN THE DEEP SPACE NETWORK
R. L. Sirpilla *In its* The Telecomm. and Data Acquisition Rept. 15 Oct. 1981 p 162-168 ref (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 14D

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-11486 Royal Aircraft Establishment, Bedford (England).
STRENGTH BEHAVIOUR OF FATIGUE CRACKED LUGS

Ph.D. Thesis
W. Geier Jan. 1981 101 p refs Transl. into ENGLISH of Festigkeitsverhalten von Rissbehafteten Augenstaeben, Munich, 1980
(RAE-Lib-Trans-2057; BR80140) Copyright. Avail: Issuing Activity

The stress intensity is described on the basis of the linear-elastic principles. Examination of various methods for determining the stress intensity shows that the crack propagation method is particularly appropriate for the lug. Due to a lack of suitable tests on cracked lugs, a gradual approach to the lug is made, starting with an infinite plate with a hole and continuing with a finite plate with and without pin loaded holes, since stress intensity solutions are already available in this case. An experimental investigation of the lug not only enables the stress intensity to be determined, but also shows the interrelationship between the essential lug parameters, the crack propagation behavior and the stress distribution in a non-cracked lug. It is possible to evolve a stress intensity solution for cracked lugs in the form of a semi-empirical approach, which takes into account the essential lug parameters. Author

N82-11487 Royal Aircraft Establishment, Bedford (England).
FATIGUE INITIATION AT A HIGH OR LOW NUMBER OF CYCLES
J.-L. Chaboche Nov. 1980 52 p refs Transl. into ENGLISH of "Amorcage en Fatigue a Faible ou Grand Nombre de Cycles" Rept. ONERA-TP-1979-134 ONERA, France
(RAE-Lib-Trans-2056; BR77988; ONERA-TP-1979-134) Copyright. Avail: Issuing Activity

This general framework is based on the thermodynamics of deformable and damageable solids, making possible the introduction of the concept of variable internal macroscopy, part of which is associated with variable damage more specifically related to fatigue problems. The different 'measurements' of this variable of state are discussed under the mechanical engineer's optics of continuous media, and the thermodynamic model makes it possible to justify certain basic hypotheses concerning the nature of the damage, its final value at rupture, its mode of evolution, its irreversibility, its effect on the behaviour of other material characteristics. The most practical aspects are approached by way of observations generally carried out during fatigue tests, namely in the domain of the fatigue limit, the endurance limit or in the domain of fatigue at a low number of cycles. The classical criteria are recalled, making it possible to interpret fatigue limits, the effect of the mean stress, the number of cycles at crack initiation, the accumulation of damage, and phenomenological models are proposed within the scope of isotropic damage. Problems associated with elevated temperatures, which can lead to effects of an interaction between the fatigue damage and flow damage are dealt with more briefly. Author

N82-11488*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN IMPROVED TRANSVERSE SHEAR DEFORMATION THEORY FOR LAMINATED ANTISOTROPIC PLATES
M. V. V. Murthy Nov. 1981 39 p refs
(NASA-TP-1903; L-14533) Avail: NTIS HC A03/MF A01 CSCL 20K

An improved transverse shear deformation theory for laminated anisotropic plates under bending is presented. The theory eliminates the need for an arbitrarily chosen shear correction factor. For a general laminate with coupled bending and stretching, the constitutive equations connecting resultants with average displacements and rotations are derived. Simplified forms of these relations are also obtained for the special case of a symmetric laminate with uncoupled bending. The governing equation for this special case is obtained as a sixth-order equation for the normal displacement requiring prescription of the three physically natural bounday conditions along each edge. For the limiting case of isotropy, the present theory reduces to an improved version of Mindlin's theory. Numerical results are obtained from the present theory for an example of a laminated plate under cylindrical bending. Comparison with results from exact three-dimensional analysis shows that the present theory is more accurate than other theories of equivalent order. Author

N82-11489*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESEARCH IN NONLINEAR STRUCTURAL AND SOLID MECHANICS
Harvey G. McComb, Jr., comp. and Ahmed K. Noor, comp. (Joint Inst. for Advancement of Flight Sciences) Jun. 1981 44 p refs Presented at Symp. held at Washington, D.C., 6-8 Oct. 1980; Sponsored by George Washington Univ., NSF, American Society of Civil Engineers and ASME
(NASA-CP-2147-Suppl; L-13950) Avail: NTIS HC A03/MF A01 CSCL 20K

Recent and projected advances in applied mechanics, numerical analysis, computer hardware and engineering software, and their impact on modeling and solution techniques in nonlinear structural and solid mechanics are discussed. The fields covered are rapidly changing and are strongly impacted by current and projected advances in computer hardware. To foster effective development of the technology perceptions on computing systems and nonlinear analysis software systems are presented. T.M.

N82-11490*# Texas Univ. at Arlington. Center for Aeronautical Research.
MODAL ANALYSIS USING A FOURIER ANALYZER, CURVE-FITTING, AND MODAL TUNING
Roy R. Craig, Jr. and Yung-Tseng Chung 1 Oct. 1981 41 p refs
(Contract NAS8-33980)
(NASA-CR-161886; CAR-81-1) Avail: NTIS HC A03/MF A01 CSCL 20K

The proposed modal test program differs from single-input methods in that preliminary data may be acquired using multiple inputs, and modal tuning procedures may be employed to define closely spaced frquency modes more accurately or to make use of frequency response functions (FRF's) which are based on several input locations. In some respects the proposed modal test proram resembles earlier sine-sweep and sine-dwell testing in that broadband FRF's are acquired using several input locations, and tuning is employed to refine the modal parameter estimates. The major tasks performed in the proposed modal test program are outlined. Data acquisition and FFT processing, curve fitting, and modal tuning phases are described and examples are given to illustrate and evaluate them. J.M.S.

N82-11491*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INTEGRATED ANALYSIS OF ENGINE
Christos C. Chamis 1981 24 p refs Presented at the Ann. Meeting of the ASME, Washington, D.C., 16-21 Nov. 1981
(NASA-TM-82713; E-995) Avail: NTIS HC A02/MF A01 CSCL 20K

The need for light, durable, fuel efficient, cost effective aircraft requires the development of engine structures which are flexible, made from advaced materials (including composites), resist higher temperatures, maintain tighter clearances and have lower maintenance costs. The formal quantification of any or several of these requires integrated computer programs (multi-level and/or interdisciplinary analysis programs interconnected) for engine structural analysis/design. Several integrated analysis computer prorams are under development at Lewis Reseach Center. These programs include: (1) COBSTRAN-Composite Blade Structural Analysis, (2) CODSTRAN-Composite Durability Structural Analysis, (3) CISTRAN-Composite Impact Structural Analysis, (4) STAEBL-StruTailoring of Engine Blades, and (5) ESMOSS-Engine Structures Modeling Software System. Three other related programs, developed under Lewis sponsorship, are described. Author

N82-11492*# JAYCOR, Woburn, Mass.
A REVIEW OF AN ATTEMPT TO CREATE SHATTER CONES WITH MAGNETIC FLYER PLATE TECHNOLOGY Final Report, 28 Nov. 1979 - 28 Nov. 1980
Harold J. Linnerud 8 Apr. 1981 73 p
(Contract NASw-3328)
(NASA-CR-164614; J206-81-005-FR) Avail: NTIS HC A04/MF A01 CSCL 20K

The feasibility of creating shatter cones in a controlled laboratory environment is discussed. Magnetic flyer plate technology, which generates high amplitude shock waves in test

materials is discribed. Considerable sample shear and break up was observed, however, no shatter cones are found in the tested samples. E.A.K.

N82-11493*# Howard Univ., Washington, D. C.
STUDY OF FOLDABLE ELASTIC TUBES FOR LARGE SPACE STRUCTURE APPLICATIONS, PHASE 3 Final Report
Irving W. Jones and Steve O. Mitchell Sep. 1981 46 p refs (Grant NsG-1320)
(NASA-CR-164929) Avail: NTIS HC A03/MF A01 CSCL 20K

A bi-convex foldable elastic tube, suitable for use in self deploying space structures, was subjected to a series of buckling tests to deterine initial buckling loads, collapse loads, and the buckling mode. The tube is cylindrical with a cross-section that is lenticular-like with flared edges. It is capable of being flattened in the center and folded compactly, storing up strain energy in the process. Upon removal of constraint, it springs back to its original straight configuration, releasing the stored strain energy. The tests showed that this type of tube has good resistance to buckling, with the initial buckling loads all falling within or above the range of those for comparable circular cylindrical tubes. M.G.

N82-11494# California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.
DYNAMIC FRACTURE IN VISCOELASTIC SOLIDS Annual Report, 1 Jan. - 31 Aug. 1981
K. S. Kim and Wolfgang G. Knauss 2 Jul. 1981 87 p refs (Contract N00014-78-C-0634)
(AD-A104687; GALCIT-SM-81-7) Avail: NTIS HC A05/MF A01 CSCL 11/9

Dynamic crack propagation in viscoelastic media is studied experimentally with a polyester known as Homalite 100 and a polyurethane known as Solithane 113 at various temperatures. Employing the optical method of caustics, high speed photography is used to determine the variation of the stress intensity factor and the velocity of a running crack initiated and driven by the dynamic step loading on the faces of an initial semi-infinite track in an infinite medium. The loading condition is simulated experimentally with the technique introduced by Smith and Knauss. In this work an application of the method of caustics is extended for the determination of the time dependent stress intensity factor of a running crack in a viscoelastic material. Also, the viscoelastic effects on the initiation of a running crack, the variation of the stress intensity factor, the speed of the crack and the branching of the running crack are discussed. In addition, a mechanism of branching is proposed based on the study of the fracture surfaces. Author (GRA)

N82-11495# Cornell Univ., Ithaca, N. Y. Dept. of Theoretical and Applied Mechanics.
DETECTION OF VIBRATIONS IN METALLIC STRUCTURES USING SMALL PASSIVE MAGNETIC FIELDS Topical Report, Jan. - Dec. 1980
F. C. Moon and K. Hara 1 Mar. 1981 24 p refs (Contract N00014-79-C-0224)
(AD-A104405) Avail: NTIS HC A02/MF A01 CSCL 14/2

An experimental method is discussed for detecting vibrations of metal structure using magnetic fields. The theory assumes that the metallic structure acts as an antenna either through some small residual magnetization in ferromagnetic structures or through induced eddy currents. The detector consists of a noncontacting passive inductance coil. GRA

N82-11496# Dayton Univ., Ohio.
ESTIMATING THE STATISTICAL PROPERTIES OF CRACK GROWTH FOR SMALL CRACKS Final Report, Sep. 1979 - Sep. 1980
P. W. Hovey, J. P. Gallagher, and A. P. Berens Wright-Patterson AFB, Ohio AFWAL Mar. 1981 33 p refs
(Contract F33615-78-C-5184; AF Proj. 2418)
(AD-A104672; UDR-TR-80-123; AFWAL-TR-81-4016) Avail: NTIS HC A02/MF A01 CSCL 11/6

A series of statistical studies were conducted on two sets of fatigue crack growth data which were generated under variable amplitude loading from cracks that initiated in 7475-T7351 Aluminum down in the bore of typical aircraft quality prepared holes. The study considered fatigue crack growth (life) behavior and fatigue crack growth rate behavior. Generally, the study showed that small crack growth behavior was similar to that observed for larger cracks and that a stress intensity factor parameter could be used to describe the mean trend of the fatigue crack growth rate behavior via a power law relationship. Author (GRA)

N82-11497# Georgia Inst. of Tech., Atlanta. School of Chemical Engineering.
ELECTROCHEMICAL CONDITIONS WITHIN STRESS CORROSION CRACKS (EXPERIMENTAL TECHNIQUES) Final Report, 1 Apr. 1980 - 30 Jun. 1981
Miroslav Marek Sep. 1981 48 p refs
(Contract DAAG29-80-C-0098)
(AD-A104246; ARO-17082.1-MS) Avail: NTIS HC A03/MF A01 CSCL 20/11

The objective of this investigation was to determine the electrochemical conditions in propagating stress corrosion cracks. In the first phase of the project, which is the subject of this report, the aim was to develop improved techniques of the measurement of the solution chemistry and potential within the cracks. While many techniques were explored only the most promising ones were selected for actual analyses of conditions within cracks. Author (GRA)

N82-11498# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
STRUCTURAL ANALYSIS COMPUTER PROGRAMS FOR RIGID MULTICOMPONENT PAVEMENT STRUCTURES WITH DISCONTINUITIES, WESLIQID AND WESLAYER. REPORT 1: PROGRAM DEVELOPMENT AND NUMERICAL PRESENTATIONS Technical Report, 1 Oct. 1978 - 30 Sep. 1979
Yu T. Chou May 1981 150 p refs
(DA Proj. 4A7-62719-AT-40)
(AD-A104545; WES/TR/GL-81-6-1) Avail: NTIS HC A07/MF A01 CSCL 13/13

This study was conducted to develop finite element computer programs to calculate stresses and deflections in rigid pavements with cracks and joints subjected to loads and temperature warping, as well as in the supporting subgrade soil. The joints are connected by dowel bars or other load transfer devices. The slabs can have full or partial loss of subgrade support over designed regions of the slabs. Multiple-wheel loads can be handled and the number of wheels is not limited. Two programs were developed, one called WESLIQID and the other WESLAYER. The former is for pavements on liquid foundations and the latter is for linear layered elastic solids. Variable slab thicknesses and moduli of subgrade reaction are incorporated in the WESLIQID program, and any number of slabs arrayed in an arbitrary pattern can be handled. Because of larger computer storage requirement and computational complexity, the WESLAYER program is limited to two slabs. GRA

N82-11499# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
STRUCTURAL ANALYSIS COMPUTER PROGRAMS FOR RIGID MULTICOMPONENT PAVEMENT STRUCTURES WITH DISCONTINUITIES, WESLIQID AND WESLAYER. REPORT 2: MANUAL FOR THE WESLIQID FINITE ELEMENT PROGRAM
Yu T. Chou May 1981 144 p
(DA Proj. 4A7-62719-AT-40)
(AD-A104546; WES/TR/GL-81-6-2) Avail: NTIS HC A07/MF A01 CSCL 13/13

This study was conducted to develop finite element computer programs to calculate stresses and deflection in rigid pavements with cracks and joints subjected to loads and temperature warping, as well as in the supporting subgrade soil. This report is presented as a user's manual for the WESLIQID program, which deals with pavements on a liquid foundation. The program allows for analysis of pavements with full or partial loss of subgrade support over designated regions of the pavements. Variable slab thickness amd modulus of subgrade reaction k are incorporated and any number of slabs arranged in an arbitrary pattern can be handled. Also, mulitple-wheel loads can be used, and the number of wheels is not limited. The nature of the computer program and its programming logic are first delineated, followed

by a general discussion on the efficient and correct usage of the programs, e.g., the efficient way of arranging nodal numbers to minimize the bandwidth. The input guide to the compter program is presented with a detailed explanation for each input variable. Five example problems with input data are presented and the computer printouts of three problems are included with detailed explanations. GRA

N82-11500# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.

STRUCTURAL ANALYSIS COMPUTER PROGRAMS FOR RIGID MULTICOMPONENT PAVEMENT STRUCTURES WITH DISCONTINUITIES, WESLIQID AND WESLAYER. REPORT 3: MANUAL FOR THE WESLAYER FINITE ELEMENT PROGRAM

Yu. T. Chou May 1981 68 p refs
(DA Proj. 4A7-62719-AT-40)
(AD-A104547; WES/Tr/GL-81-6-3) Avail: NTIS HC A04/MF A01 CSCL 13/13

This study was conducted to develop finite element computer programs to calculate stresses and deflections in rigid multicomponent pavements with cracks and joints, as well as in the supporting subgrade soil, subjected to loads and temperature warping. This report is presented as a user's manual for the WESLAYER program, which deals with pavements on layered elastic solids. The pavement can have full or partial loss of subgrade support over designated regions of the pavements. Multiple-wheel loads can be used in the computation and the number of wheels is not limited. Because of large storage space needed and long computer time required to obtain solutions, the program is limited to only a two-slab system. The nature of the computer program and its program logic are first delineated, followed by a general discussion on the efficient and correct use of the program. An input guide to the computer program is presented with a detailed explanation for each input variable. Example problems with input data and output printouts are presented. GRA

N82-11501# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.

LIGHTWEIGHT CONCRETE MATERIALS AND STRUCTURAL SYSTEMS FOR WATER TANKS FOR THERMAL STORAGE Final Report

R. W. Buckman, Jr., G. G. Elia, and Y. Ichikawa Dec. 1980 98 p refs
(Contracts DE-AC02-78CS-34703; EM-78-C-02-4703)
(COO-4703-26) Avail: NTIS HC A05/MF A01

Thermally efficient hot water storage tanks were designed, fabricated and evaluated. The tanks were made using cellular concrete at a nominal density of 100 lb/cu ft for the structural elements and at a 30 lb/cu ft density for the insulating elements. Thermal performance testing of the tanks was done using a static decay test. A series of composition modifications to the cellular concrete mix were investigated and the addition of alkaline resistant glass fibers was found to enhance the mechanical properties at no sacrifice in thermal behavior. Economic analysis indicated that cellular concrete provides a cost effective insulating material. The total portability of the plant for producing cellular concrete makes cellular concrete amenable to on-site fabrication and uniquely adaptable to retrofit applications. DOE

N82-11502# General Electric Co., Schenectady, N. Y. Corporate Research and Development Dept.

ENGINEERING APPROACH FOR ELASTIC-PLASTIC FRACTURE ANALYSIS

V. Kumar, M. D. German, and C. F. Shih Jul. 1981 226 p refs Sponsored by EPRI
(EPRI Proj. 1237-1)
(DE81-904218; EPRI-NP-1931) Avail: NTIS HC A11/MF A01

Formulas, charts, and background material that allow calculation of safety margins in ductile structures containing flaws are presented. The analysis procedures already available for brittle elastic materials to the tough and ductile steels used in the construction of pressure boundary components are presented. The elastic plastic methods describe the behavior of ductile materials. DOE

N82-11503# Los Alamos Scientific Lab., N. Mex.

FINITE ELEMENT ANALYSIS OF THE SPLIT HOPKINSON BAR

Mathew J. Kramer (Rochester Univ., N.Y.) Jul. 1981 30 p refs
(Contract W-7405-eng-36)
(DE81-030387; LA-8921-MS) Avail: NTIS HC A03/MF A01

The finite element method, its ability to analyze the split Hopkinson bar apparatus used in studying the dynamic properties of materials was investigated. An explicit isoparametric finite element computer code, HONDO, was investigated for its accuracy in solving stress wave propagation problems in cylindrical bars in one and two dimensions. HONDO was checked against a two dimensional finite difference wave code, TOODY, for solution accuracy and computational time in analyzing the split Hopkinson bar. It is concluded that HONDO is capable of using fewer mesh points than TOODY, and HONDO requires less storage. DOE

N82-11504# California Univ., Livermore. Lawrence Livermore Lab.

DYNAMIC MEASUREMENT OF POISSON'S RATIO IN GRANULAR MATERIALS AT 0.2 TO 0.8 GPa

C. W. Olsen Jul. 1981 20 p refs
(Contract W-7405-eng-48)
(DE81-027559; UCRL-85539) Avail: NTIS HC A02/MF A01

A technique for mesurement of Poisson's ratio for shock-loaded, granular material was developed. All tests were conducted in a 63.5 mm diameter gas-gun. A fixed knife-edge of three thicknesses of 0.3 mm stainless steel was instrumented with carbon stress gauges and Constantan strain gauges. A 0.13 mm stainless steel cover provided gauge protection. The knife-edge was mounted in the target material, dry sand, so as to measure the transverse pressure. By knowing the impact pressure and the orthogonal pressure, Poisson's ratio could be determined. Since the gauges were being loaded edge-on, they had to be kept small in the directon of shock propagation. Additonally, the effects of strain were measured with the Constantan gauges and subtraced. In the sand (1.70 Mg/cu m, approximately 37 vol % porosity) the apparent Poisson's ration increases with impact stress, going from approximately 0.20 at 0.2 GPa to approximately 0.34 at 0.73 GPa. DOE

N82-11505# California Univ., Livermore. Lawrence Livermore Lab.

ON-LINE FAILURE DETECTION OF VIBRATING STRUCTURES

S. G. Azevedo, J. V. Candy, and D. L. Lager 27 May 1981 26 p refs Presented at the ASME Conf. on Mech. Vibration and Noise, Hartford, 20-23 Sep. 1971
(Contract W-7405-eng-48)
(UCRL-86099; CONF-810918-1) Avail: NTIS HC A03/MF A01

Nondestructive evaluation of vibrating structures for failure detection is addressed. Recent advances in signal processing and analysis of vibrating structures are applied to this problem with promising results. The techniques used are recursive on-line algorithms which include stochastic models for noise sources. An experiment was designed to investigate the feasibility of signal processing procedures for failure detection. A given structure was excited and its shock response measured using an accelerometer. The response data was digitized and processed. This failure detection problem was approached from the stochastic estimation theory viewpoint. A nonlinear identification algorithm (using an extended Kalman filter) is utilized for estimating modal parameters from vibration data. The estimator is followed by a decision device to detect structural failures or anomalies. The results indicate reasonable performance of these techniques for model characterization and failure detection. Examples and graphical illustrations are presented. DOE

N82-11506# Sandia Labs., Albuquerque, N. Mex.

ANALYSES OF DUCTILE FLOW AND FRACTURE IN TWO DIMENSIONS

M. E. Kipp and Lee Davison 1981 8 p refs Presented at the Shock Compression of Solids Conf., Stanford, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)

(DE81-023651; SAND-81-0070C; CONF-8106125-1) Avail: NTIS HC A02/MF A01

Viscoplastic flow and spall fracture by ductile void growth is discussed. The method was extended to configuration of dimensional plane strain and axisymmetric deformation. Current work includes reduction of the general theory to a form applicable to these cases, and incorporation of the resulting equations into a Lagrangian finite difference code suitable for analyzing nonlinear wave propagation. Results of applying this code to study of symmetric axial impact of aluminum bars are presented. DOE

N82-11507# Rockwell International Corp., Canoga Park, Calif. Atomics International Div.

VIBRATION SIGNATURE ANALYSIS AND ACOUSTIC-EMISSION MONITORING AT BRAYTON POINT Final Report

P. J. Pekrul and S. Pennise Jul. 1981 268 p Sponsored by Electric Power Research Inst.

(EPRI Proj. 734-1)

(DE81-904232; EPRI-CS-1938) Avail: NTIS HC A12/MF A01

On-line monitoring techniques of vibration signature analysis and acoustic emission detection are discussed in light of a two-year monitoring program at the Brayton Point plant of New England Power Service Company. Included in the study are discussion relating to sensor selection and location, spectrum analysis techniques, computation equipment, and display devices. Specific plant equipment failures occurred during the monitoring period, and the appropriate vibration and acoustic emission data are analyzed to assess any deviations prior to failure. Vibration signature analysis is seen to be a well-developed technique which can be successfully implemented into a preventative maintenance system for fossil plants. Before being able to detect changes in vibration spectra due to malfunction, however, it is stressed that a full understanding of the effect of normal variations in plant parameters (load, speed, etc.) should be achieved. This implies a statistical base of information and derived correlation equations. Acoustic emissions may have application for detection of material failure, such as shaft cracking, and for detection of tube leaks from heat exchangers. These tests, however, were inconclusive and suggest that considerable characterization data are required before acoustic emissions can be successfully implemented as a diagnostic technique. DOE

N82-11508# National Physical Research Lab., Pretoria (South Africa).

FORMULAE FOR THE HOMOGENEOUS ISOTROPIC PERFECTLY LINEAR ELASTIC CONTINUUM

H. G. Denkhaus Jul. 1980 83 p refs

(PB81-222846; CSIR-ME-1665; ISBN-0-7988-169-1) Avail: NTIS HC A05/MF A01 CSCL 20K

A collection of formulae which provide a reference manual of the basic equations of the classical theory of elasticity was compiled. General and special cases of Hooke's law and the basic equations for plane stress and plane strain are included. GRA

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-11509 Washington Univ., Seattle.

IDENTIFICATION OF LITHOLOGIC UNITS USING MULTI-CHANNEL IMAGING SYSTEMS Ph.D. Thesis

Diane Louise Evans 1981 129 p

Avail: Univ. Microfilms Order No. 8121194

It is shown that is possible to compare laboratory reflectance spectra directly with multispectral images. The signal that would be produced if a particular laboratory sample were in a detector's field of view was calculated and converted into a digital number of DN value. Stacks of spatially registered multispectral images were then searched for materials that had spectral characteristics similar to the laboratory samples. When laboratory reflectance spectra of a suite of Hawaiian samples were compared to Viking Lander images of Mars, a weathered basaltic tephra from a Hawaiian cinder cone was found to have spectral characteristics that were similar in all bandpasses to surficial deposit at the Viking 1 site. When the reflectance spectra of the suite of samples were compared to Viking Orbiter images, the same Hawaiian tephra was found to correspons to a regional spectral unit in the low latitudes of Mars. It was also possible to compare laboratory reflectance spectra to Landsat images of the Earth. Comparison of laboratory reflectance spectra with multispectral images make it possible to derive compositional information from the images. Dissert. Abstr.

N82-11510*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

A MODEL DESCRIBING THE MICROWAVE EMISSION FROM A MULTI-LAYER SNOWPACK AT 37 GHZ

M. Abdelrazik, F. Ulaby, and H. Stiles Feb. 1981 136 p refs (Grant NsG-5335)

(NASA-CR-166708; RSL-TR-410-2) Avail: NTIS HC A07/MF A01 CSCL 08L

A multilayer emission model is described and applied to emission measurements obtained at 37 GHz and H polarization using a microwave radiometer attached to a truck-mounted boom in Steamboat Springs, Colorado in 1977. Estimated absorption and scattering coefficients and their dependence on wetness were obtained using calculated values of the dielectric constant at 37 GHz along with the model. It was found that the scattering coefficient is comparable in value to the absorption coefficient for dry snow however, the absorption coefficient increases linearly with increasing snow wetness while the scattering coefficient decreases linearly with increasing wetness. The emission from each layer of the snowpack was also calculated using the estimated coefficients. It is shown that for dry snow, the ground underneath the snowpack contributes about 45% of all measured emission while the rest is due to emission from all the layers within the snowpack. When the wetness of the top 5 cm layer of snowpack increases to about 2% by volume, this top 5 cm snowlayer contributes more than 90% of all the measured emission. A.R.H.

N82-11511*# Ball Aerospace Systems Div., Boulder, Colo.

DEVELOPMENT OF THE COASTAL ZONE COLOR SCANNER FOR NIMBUS 7. VOLUME 1: MISSION OBJECTIVES AND INSTRUMENT DESCRIPTION Final Report

May 1979 76 p refs

(Contract NAS5-20900)

(NASA-CR-166720-Vol-1; F78-11-Rev-A) Avail: NTIS HC A05/MF A01 CSCL 14B

An Earth scanning six channel (detector) radiometer using a classical Cassegrain telescope and a Wadsworth type grating spectrometer was launched aboard Nimbus 7 in order to determine the abundance or density of chlorophyll at or near the sea surface in coastal waters. The instrument also measures the sediment or gelbstroffe (yellow stuff) in coastal waters, detects surface vegetation, and measures sea surface temperature. Block diagrams and schematics are presented, design features are discussed and each subsystem of the instrument is described. A mission overview is included. A.R.H.

N82-11512*# Research and Data Systems, Inc., Lanham, Md.

SMMR DATA SET DEVELOPMENT FOR GARP

John Kogut May 1981 60 p

(Contract NAS5-25781)

(NASA-CR-166721) Avail: NTIS HC A04/MF A01 CSCL 05B

The NIMBUS 7 Scanning Multichannel Microwave Radiometer (SMMR) data are analyzed. The impact of cross polarization and Faraday rotation on SMMR derived brightness temperatures is

evaluated. The algorithms used to retrieve the geophysical parameters are tested, refined, and compared with values derived by other techniques. The technical approach taken is described and the results presented. S.L.

N82-11513*# Environmental Research and Technology, Inc., Concord, Mass.

AN EVALUATION OF THE SPATIAL RESOLUTION OF SOIL MOISTURE INFORMATION Final Report

Kenneth R. Hardy, Stephen H. Cohen, Linda Koshio Rogers, Hsiao-hua K. Burke, Robert C. Leupold, and Michael D. Smallwood Mar. 1981 83 p refs

(Contract NAS5-25527)

(NASA-CR-166724; ERT-P-7505-F) Avail: NTIS HC A05/MF A01 CSCL 08M

Rainfall-amount patterns in the central regions of the U.S. were assessed. The spatial scales of surface features and their corresponding microwave responses in the mid western U.S. were investigated. The usefulness for U.S. government agencies of soil moisture information at scales of 10 km and 1 km. was ascertained. From an investigation of 494 storms, it was found that the rainfall resulting from the passage of most types of storms produces patterns which can be resolved on a 10 km scale. The land features causing the greatest problem in the sensing of soil moisture over large agricultural areas with a radiometer are bodies of water. Over the mid-western portions of the U.S., water occupies less than 2% of the total area, the consequently, the water bodies will not have a significant impact on the mapping of soil moisture. Over most of the areas, measurements at a 10-km resolution would adequately define the distribution of soil moisture. Crop yield models and hydrological models would give improved results if soil moisture information at scales of 10 km was available. A.R.H.

N82-11514*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RADAR MAPPING, ARCHAEOLOGY, AND ANCIENT LAND USE IN THE MAYA LOWLANDS

R. E. W. Adams (Cambridge Univ.), W. E. Brown, Jr., and T. Patrick Culbert (Arizona Univ.) 31 Mar. 1981 27 p refs

(Contract NAS7-100)

(NASA-CR-164931) Avail: NTIS HC A03/MF A01 CSCL 08B

Data from the use of synthetic aperture radar in aerial survey of the southern Maya lowlands suggest the presence of very large areas drained by ancient canals for the purpose of intensive cultivation. Preliminary ground checks in several very limited areas confirm the existence of canals and raised fields. Excavations and ground surveys by several scholars provide valuable comparative information. Taken together, the new data suggest that Late Classic period Maya civilization was firmly grounded in large-scale and intensive cultivation of swampy zones. A.R.H.

N82-11515*# OAO Corp., Hampton, Va.

TECHNOLOGY TRANSFER OF NASA MICROWAVE REMOTE SENSING SYSTEM Final Report

N. D. Akey Oct. 1981 38 p refs

(Contract NAS1-16380)

(NASA-CR-165791) Avail: NTIS HC A03/MF A01 CSCL 14B

Viable techniques for effecting the transfer from NASA to a user agency of state-of-the-art airborne microwave remote sensing technology for oceanographic applications were studied. A detailed analysis of potential users, their needs and priorities; platform options; airborne microwave instrument candidates; ancillary instrumentation; and other, less obvious factors that must be considered were studied. Conclusions and recommendations for the development of an orderly and effective technology transfer of an airborne microwave system that could meet the specific needs of the selected user agencies are reported. R.J.F.

N82-11516*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GEOLOGIC CONSIDERATIONS IN UNDERGROUND COAL MINING SYSTEM DESIGN

Frank A. Camilli, David P. Maynard, Arnis Mangolds, and Jack Harris 1 Oct. 1981 52 p refs

(Contracts NAS7-100; DE-AI01-76ET-12548)

(NASA-CR-164961; JPL-Pub-81-74; DOE/ET-12548/9) Avail: NTIS HC A04/MF A01 CSCL 08I

Geologic characteristics of coal resources which may impact new extraction technologies are identified and described to aid system designers and planners in their task of designing advanced coal extraction systems for the central Appalachian region. These geologic conditions are then organized into a matrix identified as the baseline mine concept. A sample region, eastern Kentucy is analyzed using both the developed baseline mine concept and the traditional geologic investigative approach. A.R.H.

N82-11517# Anacapa Sciences, Inc., Santa Barbara, Calif. Military Programs Dept.

CONCEPTUAL DESIGN OF A COMPUTER-GENERATED TOPOGRAPHIC DISPLAY SYSTEM TO AID MISSION PLANNING AND MISSION CONDUCT BY ARMY AVIATORS Final Technical Report, Mar. 1980 - Jun. 1981

Steven P. Rogers Jun. 1981 136 p refs

(Contract DAHC-78-C-0012)

(AD-A104388; Rept-365-81; USAAVRADCOM-TR-78-0012-F) Avail: NTIS HC A07/MF A01 CSCL 15/7

This report describes the requirements for a computer-generated topographic display for use by Army aviators during performance of mission-planning and in-flight tasks, and presents a conceptual design for a system. Section I of the report describes the background leading up to the conduct of the project, the project objective, the project approach, and the organization of the report. Section II of the report provides a background in the missions, organization, and procedures of Army aviation units for readers not thoroughly familiar with these topics. Much of the information in this section is based on data from in-depth interviews with aviators of the 101st Airborne Division. Section III of the report describes the configuration and operation of the recommended computer-generated topographic display system. The general philosophy guiding the conceptual design is discussed, followed by a description of the system components and their functions. Extensive descriptions of the interactive, multi-function, control-display units are provided, accompanied by summaries of the aviator requirements, present deficiencies, and computer capabilities that led to the incorporation of the various special features of the system. Author (GRA)

N82-11518# Argonne National Lab., Ill. Energy and Environmental Systems Div.

PETROLEUM GEOLOGY AND RESOURCE ASSESSMENT OF THE MIDDLE CASPIAN BASIN, USSR, WITH SPECIAL EMPHASIS ON THE UZEN FIELD

G. Ulmishek and W. Harrison May 1981 157 p refs

(Contract W-31-109-eng-38)

(DE81-029951; ANL/ES-116) Avail: NTIS HC A08/MF A01

The Middle Caspian Basin contains up to 12,000 m (40,000 ft) of sedimentary rocks ranging in age from late Paleozoic to Quaternary and has over 100 oil and gas fields varying in size from small to supergiant. The Soviet literature reviewed covers: (1) tectonic zones of the basin, including details of the lower, intermediate, and upper structural complexes; (2) paleogeography, facies distribution, and conditions of organic matter accumulation in the major petroleum source rocks; (3) stages of oil and gas generation; (4) major hydrogeological features; and (5) producing regions of the basin. Total initial petroleum resources of the basin are estimated at 22.5 x 10(9) t (166 x 10(9) bbl), of which 16.00 x 10(9) t (118 x 10 (9) bbl) are yet to be discovered. Resources of the Offshore Caspian Sea area are estimated to be 12.1, 10(9) t (89.5 x 10(8) bbl). DOE

N82-11519# Rhode Island Univ., Kingston.

PLANNING A COMPREHENSIVE PROGRAM FOR EXPLORATION OF THE ANTHRACITE DEPOSITS OF THE NARRAGANSETT BASIN OF MASSACHUSETTS AND RHODE ISLAND, PHASE 1 AND 2 Final Report

J. W. Skehan Feb. 1981 131 p refs

(Contract DE-AC01-79RA-2036)

(DE81-028490; DOE/FE-20036/1) Avail: NTIS HC A07/MF A01

Coal deposits occur in a sporadic fashion throughout the Basin with little continuity as to the type of deposit and the quality of coal thus making it difficult, perhaps very expensive

and risky, to base a drilling program soley on stepping out from known outcrops and coal occurrences. The combination of understanding the original depositional environment, its subsequent deformation to stepping out from known coal occurrences, is believed to be the most efficient basis for developing a comprehensive drilling program plan for the Basin. This limited exploration program produced resource estimates of 11.35 million tons of anthracite material in the eastern and 4.73 in the western part of Portsmouth, Rhode islands, area and 4.2 million tons in Plainville, Machusetts. These estimates are based on USGS recommended methods for resource determination. The cost of finding this material, based on the cost of the contracts, comes out to be approximately 1.5 cents per ton. DOE

N82-11520# Royal Norwegian Council for Scientific and Industrial Research, Oslo.

PLAN FOR TECHNOLOGICAL RESEARCH AND DEVELOPMENT RELATED TO THE PETROLEUM ACTIVITIES ON THE NORWEGIAN CONTINENTAL SHELF. 1981-1985: APPENDIXES: 1. TECHNICAL CHALLENGES. 2. RESEARCH REQUIREMENTS. 3. HIGH PRIORITY PROGRAMS

10 May 1980 171 p

(DE81-904014; NP-1904014) Avail: NTIS HC A08/MF A01

The environmental and geographical conditions on the Norwegian Continental Shelf (NCS) which may effect field exploration and development philosophy or the choice of technological solutions are identified. Research requirements are described in the areas of physical environment; petroleum exploration; petroleum technology; production technology; sub-sea production systems; platforms and supporting equipment; storage and offshore loading; pipelines; underwater support functons; above-water support functions; automation in offshore production and transportation; communications and positioning; materials and corrosion protection; quality assurance; and regulations. High priority programs were defined based on the general objectives of the national petroleum policy, resource management, safety, industrial development, and cost reduction. DOE

N82-11521# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

RAFT RIVER GEOTHERMAL PROJECT GROUNDWATER MONITORING PROGRAM Progress Report

Piotr Skiba, Dennis Goldman, Susan Spencer, and Laurence Hull Jul. 1981 42 p

(Contract DE-AC07-76ID-01570)

(DE81-030202; EGG-2119) Avail: NTIS HC A03/MF A01

The Raft River 5 MWe geothermal power plant requires 150 L/s of geothermal fluid at 1400 C, with an estimated 130 L/s being discharged to intermediate depth injection wells during normal plant operation. A monitoring program was established to investigate the effects of geothermal fluid disposal on shallow irrigation wells at Raft River. This data collected from seven monitor wells during 1980 (including the first quarter of FY 1981) are summarized and the potential effects on shallow aquifers of the production and injection of geothermal fluids are discussed. DOE

N82-11522# Science Applications, Inc., McLean, Va.

IDENTIFICATION OF GEOPRESSURED OCCURRENCES OUTSIDE OF THE GULF COAST

Oscar Strongin 1981 6 p refs Presented at IECEC Conf., Atlanta, 9 Aug. 1981

(Contract DE-AC08-80NV-10133)

(DE81-025511; CONF-810812-28) Avail: NTIS HC A02/MF A01

Methane dissolved in saline formation waters under abnormally high pressure (geopressure) is one of several unconventional gas sources that is under intensive investigation by the Department of Energy. The most well known and studied region of geopressure in the US is the Gulf Coast geosyncline. Recent studies, however, indicate that the phenomenon is displayed in many other sedimentary basins encompassing lithologies and sedimentary environments unlike those of the Gulf Coast. These include various Rocky Mountain and Mid-Continent basins, onshore and offshore Californian, Alaskan and Pacific Coast basins, and other isolated occurrences. Of this group, two prime target areas, based on the indicated methane content of geopressured formation waters, would include the Cambrian sands of the Rome trough in West Virginia and selected Miocene sediments along the west side of the San Joaquin Valley in California. DOE

N82-11523# Boston Coll., Weston, Mass. Dept. of Geology and Geophysics.

EXPLORATION OF COAL AND ANTHRACITIC CARBONACEOUS SHALE RESOURCES, NARRAGANSETT BASIN, MASSACHUSETTS, AND RHODE ISLAND Final Report, 1 Oct. 1979 - 30 Arp. 1981

James W. Skehan, Greta E. Gill, Jonathan D. Raben, Norman Schapiro, and Daniel P. Murray May 1981 86 p refs

(Contract DE-AC01-79RA-20029)

(DE81-030895; DOE/RA-20029/T1) Avail: NTIS HC A05/MF A01

Results of continuous core drilling primarily in two contiquous fields to evaluate the carbonaceous resource are presented. Geological and analytical results, resource calculations, and evaluations of potential mining methods and conditions are included. Results of fieldwork and drilling in the Portsmouth, Rhode Island area defined the coal-bearing structure as being a southerly plunging fold, with the western limb and the eastern holes penetrating the axial portion of the fold. In the Plainville, Massachusetts area, an E-W trending anticline was defined by fieldwork and exploratory drilling. The anthracitic carbonaceous shale seam folded by this structure varies in thickness and ash content along strike. T.M.

N82-11524# Water Resources Council, Washington, D.C.

GREAT PLAINS GASIFICATION PROJECT, MERCER COUNTY, NORTH DAKOTA; WATER ASSESSMENT REPORT SECTION 13(C)

Dec. 1980 46 p refs Prepared in cooperation with Missouri River Basin Study Group

(PB81-216111) Avail: NTIS HC A03/MF A01 CSCL 08H

The features and location of a project to produce synthetic fuels from a coal gasification plant are described as well as the design of the plant and the support activities, such as mining and reclamation. The availability of the water supply is discussed including competing uses and water rights. The impacts of plant operations on water quantity and quality are assessed for the Missouri and Knife Rivers and for ground water levels. Changes to wetlands are also considered. GRA

N82-11525# Water Resources Council, Washington, D.C.

GREAT PLAINS GASIFICATION PROJECT, MERCER COUNTY, NORTH DAKOTA; WATER ASSESSMENT REPORT

4 Aug. 1980 14 p refs Prepared in cooperation with Missouri River Basin Study Group

(PB81-216129) Avail: NTIS HC A02/MF A01 CSCL 08H

A water assessment of synfuels development in the Upper Missouri River Basin was conducted. Findings assessment show that water supplies are physically available within the mainstream of the Missouri River in North Dakota to supply the requirements of the gasifiction facilities and the supporting activities -- mining and reclamation, electricity, and project-induced population increases. GRA

N82-11526# Geological Survey, Louisville, Ky. Water Resources Div.

WATER RESOURCES DATA FOR KENTUCKY, WATER YEAR 1980

Apr. 1981 819 p refs

(PB81-223612; USGS/WRD/HD-80/044; USGS-WRD-KY-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

This report contains discharge records from 116 gaging stations; stage and contents for 15 lakes; suspended-sediment data for 43 stations (28 daily); daily temperature records for 35 stations; daily specific conductance for 24 stations; ground-water level for 74 recording, 85 partial; waterquality data from 232 coal hydrology sites (28 partial, 204 miscellaneous) 3 springs and 311 wells; and miscellaneous temperature and specific conductance from the 116 gaging stations. Data for 123 partial-record crest-stage and 102 partial-record low-flow sites are included as well as those data collected at various miscellaneous sites. GRA

N82-11527# Geological Survey, Lansing, Mich. Water Resources Div.
WATER RESOURCES DATA FOR MICHIGAN, WATER YEAR 1980 Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 632 p refs
(PB81-224180; USGS/WRD/HD-80/037; USGS-WRD-MI-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Water resources data for the 1980 water year for Michigan consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels, water quality, and water temperature of ground-water wells. Data presented include discharge records for 180 gaging stations; stage only records for 4 gaging stations; stage and contents for 5 lakes and reservoirs; water quality for 62 continuous-record stations; and water levels for 52 observation wells. Information from 87 crest-stage partial-record stations and 62 low-flow partial-record stations is included. GRA

N82-11528# Geological Survey, Columbus, Ohio. Water Resources Div.
WATER RESOURCES DATA FOR OHIO, WATER YEAR 1980. VOLUME 2: ST. LAWRENCE RIVER BASIN Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 268 p refs
(PB81-217077; USGS-WRD-OH-80-2; USGS/WRD/HD-81/038) Avail: NTIS HC A12/MF A01 CSCL 08H

Records are presented for water discharge at 169 gaging stations; stage and contents at 39 lakes and reservoirs; water quality at 57 gaging stations and 83 wells; and water levels at 183 observation wells. Data are included from 84 crest-stage partial-record stations; 91 low-flow partial-record stations, and 537 coal hydrology synoptic sites. Additional water data collected at various sites not involved in the systematic data-collection program are published as miscellaneous measurements and analyses. GRA

N82-11529# Geological Survey, Tallahassee, Fla. Water Resources Div.
GROUND-WATER HYDROLOGY OF THE DADE CITY AREA, PASCO COUNTY, FLORIDA, WITH EMPHASIS ON THE HYDROLOGIC EFFECTS OF PUMPING FROM THE FORIDIAN AQUIFER
C. H. Tibbals, Warren Anderson, and C. P. Laughlin 1980 73 p refs Prepared jointly with the Southwest Florida Water Management District, Brooksville
(PB81-225518; USGS/WRD/WRI/81-058; USGS/WRI-80-33) Avail: NTIS HC A04/MF A01 CSCL 08H

Of the approximation 32 million gallons per day pumped from the Floridan aquifer in the area in 1975, about 16 million gallons per day were pumped from an area of about 0.25 square miles by Lykes-Pasco Packing Company, a citrus processing plant. There are essentially two producing zones in the Floridan aquifer in the Dade City area. The upper zone is from about 10 feet above to about 150 feet below National Geodetic Vertical Datum of 1929, and the lower zone from about 300 to about 500 feet below NGVD of 1929. There is evidence of hyraulic interconnection of the upper and lower zones of the Floridan aquifer. This appears to be highly significant in terms of the geohydrology of the Floridan aquifer in the area, particularly with regard to its ground-water flow pattern, water quality, and aquifer hydraulic characteristics. GRA

N82-11530# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
A SYSTEMS APPROACH TO THE REAL-TIME RUNOFF ANALYSIS WITH A DETERMINISTIC RAINFALL-RUNOFF MODEL
Robert J. C. Burnash and R. Larry Ferral Apr. 1981 24 p refs
(PB81-224495; NOAA-TM-NWS-WR-162; NOAA-81050703) Avail: NTIS HC A02/MF A01 CSCL 08H

The responsibility for providing the U.S. with warnings of river conditions was assigned to the National Weather Service in 1890. This requirement led to the development of a systems approach to hydrologic data collection, runoff computation, and forecast production. This system is focused on producing information on the future distribution of water in time and space which affects the safety, welfare, and economic well being of the nation and its inhabitats. A principal element of any hydrologic warning system is an effective rainfall-runoff model. GRA

N82-11531# Geological Survey, Cheyenne, Wyo. Water Resources Div.
WATER RESOURCES OF UPPER SEPARATION CREEK BASIN, SOUTH-CENTRAL WYOMING Final Report
L. R. Larson and Everett A. Zimmerman Apr. 1981 77 p refs
(PB81-224263; USGS/WRD/WRI/81-060; USGS/WRI-80-85) Avail: NTIS HC A05/MF A01 CSCL 08H

The water resources of the small basin (85 square miles) were examined before the expected start of large-scale coal mining. Streamflow was intermittent, resulting primarily from snowmelt and rainstorms. Average annual runoff was estimated at 2,500 acre feet. The 1976 runoff was 2,040 acre feet. The near absence of snowpack in 1977 resulted in greatly reduced runoff, less than 300 acre feet. Ground water is obtainable from the Mesaverde Formation, the Lance and Fort Union Formations, and from alluvium. Yields from most wells and springs are less than 10 gallons per minute. Dissolved-solids concentrations in Separation Creek ranged from less than 100 to more than 1,500 milligrams per liter during 1976. Daily mean sediment concentration ranged from 34 to 11,900 milligrams per liter. GRA

N82-11532# Geological Survey, Anchorage, Alaska. Water Resources Div.
HYDROLOGIC RECONNAISSANCE NEAR FOURTH OF JULY CREEK, SEWARD, ALASKA Final Report
Gordon L. Nelson Apr. 1981 14 p refs Prepared in cooperation with the Kenai Peninsula Borough, Alaska
(PB81-223752; USGS/WRI-81-21; AK-06250; USGS/WRD/WRI/81-056) Avail: NTIS HC A02/MF A01 CSCL 08H

The 1.3-square-mile alluvial fan of Fourth of July Creek is being developed as an industrial area and port. Fourth of July Creek is a glacier-fed stream that occupies a braided channel near the middle of the fan. The presence of glacial flour during the summer and low discharge during the winter make streamflow a poor source of water for municipal and industrial use. Water infiltrates the fan from streams and precipitation and recharges an unconfined alluvial aquifer. Average recharge is 40-50 cubic feet per second, and ground water flows toward the coast where it discharges in springs and a 0.3-mile gaining reach of the creek. Properties and concentrations of all measured chemical constituents of water samples from two wells were less than the maximum amounts recommended for drinking water. Both the aquifer and the overlying unsaturated materials are coarse grained. GRA

N82-11533# Geological Survey, Albuquerque, N. Mex.
FLOW ROUTING IN THE SUSQUEHANNA RIVER BASIN: PART 4 - ROUTING RESERVOIR RELEASES IN THE EASTERN SUSQUEHANNA RIVER BASIN IN NEW YORK STATE Final Report, 1942 - 1977
Thomas J. Zembruzuski, Jr. 1981 38 p refs Prepared in cooperation with the Susquehanna River Basin Commission
(PB81-221533; USGS/WRI-80-117; USGS/WRD/WRI-81-054) Avail: NTIS HC A03/MF A01 CSCL 08H

Flow-routing models were developed for six reaches of major streams in the eastern Susquehanna River basin in New York State and were used to trace releases of water from East Sidney Lake and Whitney Point Lake to gaged points downstream. Daily streamflow from 1942-77 was modeled for the following reaches: Susquehanna River--Unadilla to Conklin, Conklin to Vestal, and Vestal to Waverly; Chenango River--Sherburne to Greene and Greene to Chenango Forks; Tioughnioga River--Cortland to Itaska. The models were developed with convolution techniqes and were based on the unit-response method of flow routing, assuming the diffusion analogy and usin multilinearization. Overall accuracy of the models, as measured by the average difference between observed and simulated daily flos oer the

base period was within the stated accuracy of published gaging-station records used. GRA

N82-11534# Geological Survey, Lansing, Mich. Water Resources Div.

GEOLOGY AND HYDROLOGY FOR ENVIRONMENTAL PLANNING IN MARQUETTE COUNTY, MICHIGAN Final Report

F. R. Twenter Feb. 1981 53 p refs Prepared in cooperation with Michigan Dept. of Natural Resources

(PB81-221467; USGS/WRI-80-90; USGS/WRD/WRI-81-053) Avail: NTIS HC A04/MF A01 CSCL 08H

Marquette County, in the glaciated area of the upper peninsula of Michigan, includes 1,878 square miles. Precipitation averages 32 inches per year. Bedrock and glacial deposits contain materials that are good aquifers. Sedimentary bedrock units generaly yield sufficient water for domestic supply and, in places, may yield more than 100 gallons per minute to large diameter wells. In the glacial deposits, sand and gravel beds are the principal aquifers; yields to wells range from less than 10 to 200 gallons per minute. Igneous and metamorphic rocks yield little or no water to wells. GRA

N82-11535# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

ENERGY PROGRAMS AT THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY Quarterly Progress Report, Jan. - Mar. 1981

R. vonBriesen, J. E. Tillman, F. C. Paddison, C. S. Leffel, Jr., and S. Kane Apr. 1981 44 p refs

(Contracts DOE-EX-76-A-36-1008; DE-A101-79ET-27025) (PB81-218141; JHU/APL/EQR/81-1) Avail: NTIS HC A03/MF A01 CSCL 08G

The laboratory is engaged in developing energy resources, utilization concepts, and monitoring and storage methods. The report is divided into three sections. The first, geothermal energy development planning and technical assistance, contains reports on the progress of geothermal related tasks on which effort was concentrated during the quarter. The second section, siting of critical facilities, contains reports on geologic investigations in western Connecticut and areas in adjacent New york, development of seismotectonic domains, and fracture permeability in siting hazardous waste repositories. The third section, energy conservation and storage techniques, reports on institutional barriers to landfill methane recovery and the need for state legislation. T.M.

N82-11536# Hawaii Univ., Honolulu. Dept. of Planning and Economic Development.

A METHOD FOR USING AERIAL PHOTOS IN DELINEATING HISTORIC PATTERNS OF BEACH ACCRETION AND RETREAT

Dennis Hwang Dec. 1980 50 p refs

(Contract NA79AA-D-00085)

(PB81-223836; UNIHI-SG-CR-81-04; NOAA-81042706) Avail: NTIS HC A03/MF A01 CSCL 08C

A method is presented with a maximum estimated error of about 12 feet for measuring beach changes. This is believed to be an accurate estimate, as indicated by a comparison of field and photographic measurements and by the consistent distances obtained for nearby sections of the beach in the Kailua pilot study. The methods described in this report were applied for a pilot study of Kailua Beach. GRA

N82-11537# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.

ICE CONDITIONS IN THE EASTERN BERING SEA FROM NOAA AND LANDSAT IMAGERY: WINTER CONDITIONS 1974, 1976, 1977, 1979

Lyn McNutt Feb. 1981 186 p refs Prepared in cooperation with Science Applications, Inc., Bellevue, Wash.

(PB81-220188; NOAA-TM-ERL-PMEL-24; CONTRIB-500; NOAA-81043005) Avail: NTIS HC A09/MF A01 CSCL 08L

The LANDSAT and NOAA satellite images from the University of Alaska LANDSAT library were used to make maps of ice conditions in the eastern Bering Sea. The analyses included daily charts of the ice, polynya locations, floe trajectories, and comparisons between data taken from the two sources. A zoom transfer scope (ZTS) was used to transfer the data from an image to a map base for later winter condition in 1974, 1976, 1977, and 1979. GRA

N82-11538# ENSCO, Inc., Springfield, Va.

COAL MINE HAZARD DETECTION USING SYNTHETIC PULSE RADAR Open File Report, 7 Jun. 1979 - 4 Dec. 1980

James C. Fowler, Steven D. Hale, and Richard T. Houck Jan. 1981 87 p refs

(Contract DI-BM-HO-292025)

(PB81-224412; BM-OFR-79-81) Avail: NTIS HC A05/MF A01 CSCL 08I

The work was conducted in three phases. The first was an analysis of the type of errors that might cause problems, the second was to build a breadboard radar, and the third was to conduct a field test with the system. The work from each phase is discussed and the results of the field tests are presented. The results show propagation of the radar signal through 200 feet of coal along with reflections from 50 feet away. The final section contains recommendations of future development. GRA

N82-11539# Geological Survey, Nashville, Tenn. Water Resources Div.

WATER RESOURCES DATA FOR TENNESSEE, WATER YEAR 1979 Annual Water-Data Report, 1 Oct. 1978 - 30 Sep. 1979

Jan. 1981 513 p Prepared in cooperation with Tennessee Dept. of Conservation and the Tennessee Valley Authority, Knoxville

(PB81-228249; USGS/WRD/HD-80/008; USGS-WRD-TN-79-1) Avail: NTIS HC A22/MF A01 CSCL 08H

The data consist of records of stage, discharge, and water quality of streams and springs; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of wells. This report contains discharge records for 110 gaging stations; stage only records for one lake gaging station; elevation and contents for 27 lakes and reservoirs; water quality for 67 stations and 27 wells; and water levels for 27 observation wells. Also included are 105 crest-stage partial record stations, 48 low-flow partial-record stations, and 80 coal-hydrology partialrecord stations. Additional water data were collected at various stream and spring sites not involved in the systematic data collection program and are published as miscellaneous measurements and analyses, or a seepage investigations of discharge and water quality. T.M.

N82-11540# Geological Survey, Lakewood, Colo. Water Resources Div.

WASTE-ASSIMILATION CAPACITY OF THE ARKANSAS RIVER IN PUEBLO COUNTY, COLORADO, AS IT RELATES TO WATER-QUALITY GUIDELINES AND STREAM CLASSIFICATION Final Report

Doug Cain, Duaina Baldridge (Pueblo Area Council of Governments), and Patrick Edelmann 1980 118 p refs

(PB81-227340; USGS/WRD/WRI/81-063; USGS/WRI-80-82) Avail: NTIS HC A06/MF A01 CSCL 08H

The capacity of a 42-mile reach of the was evaluated using a one-dimensional steady-state water-quality model calibrated and verified using hydraulic and water-quality data collected in 1976 and 1979. The water-quality constituents modeled were 5-day carbonaceous biochemical oxygen demand, total organic nitrogen, total ammonia, total nitrite, total nitrate, and dissolved water-quality effects of 63 combinations of wastewater treatment, based on a 7-day low flow with a 10-year recurrence interval that occurs between August 15 and October 15 and on a winter low-flow period that occurs as a result of upstream storage of water. GRA

N82-11541# Geological Survey, Augusta, Maine. Water Resources Div.

WATER RESOURCES DATA FOR MAINE, WATER YEAR 1980 Annual Water-Data Report, 1 Oct. 1979 - 30 Sep. 1980

Jun. 1981 238 p refs

(PB81-226789; USGS/WRD/HD-81/042; USGS-WRD-ME-80-1) Avail: NTIS HC A11/MF A01 CSCL 08H

Water resources data consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of wells. This report contains discharge records for 61 gaging stations; stage only for 2 gaging stations; contents for 17 lakes and reservoirs; water quality for 14 gaging stations and 12 wells; and water levels for 23 observation wells. Additional water data were collected at various sites, not part of the systematic data collection program, and are published as miscellaneous measurements. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies. GRA

N82-11542# Geological Survey, Portland, Oreg. Water Resources Div.
WATER RESOURCES DATA FOR OREGON, WATER YEAR 1979 Annual Water-Data Report, 1 Oct. 1978 - 30 Sep. 1979
1981 763 p refs
(PB81-226771; USGS/WRD/HD-80/001; USGS-WRD-OR-79-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Data consist of records of stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. This report contains discharge records for 278 gaging stations; stage only records for 10 gaging stations; stage and contents for 43 lakes and reservoirs; water quality for 85 gaging stations, and water levels for 81 observation wells. Also included are 95 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data collection program, and are published as miscellaneous measurements. GRA

N82-11543# Geological Survey, Bay Saint Louis, Miss. Gulf Coast Hydroscience Center.
TEMPERATURE AND SOLUTE-TRANSPORT SIMULATION IN STREAMFLOW USING A LAGRANGIAN REFERENCE FRAME
Harvey E. Jobson Mar. 1981 187 p refs
(PB81-225757; USGS/WRI-81-2; USGS/WRD/WRI/81-066) Avail: NTIS HC A09/MF A01 CSCL 08H

The solution approach to the convective-diffusion equation uses a moving reference frame (Lagrangian) which greatly simplifies the mathematics of the solution procedure and dramatically reduces errors caused by numerical dispersion. The model documentation is presented as a series of four programs of increasing complexity. the conservative transport model can be used to route a single conservative substance, such as dye through a reach of a river. The simplified temperature model predicts water temperature in rivers using only equilibrium temperature and windspeed as meteorological input. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-11544*# Teledyne Brown Engineering, Huntsville, Ala. Engineering Services Div.
INVESTIGATION OF DIRECT SOLAR-TO-MICROWAVE ENERGY CONVERSION TECHNIQUES Final Report
N. E. Chatterton, T. K. Mookherji, and P. K. Wunsch Jan. 1978 107 p refs
(Contract NAS8-32643)
(NASA-CR-161883; ESD-78-MSFC-2174) Avail: NTIS HC A06/MF A01 CSCL 10A

Identification of alternative methods of producing microwave energy from solar radiation for purposes of directing power to the Earth from space is investigated. Specifically, methods of conversion of optical radiation into microwave radiation by the most direct means are investigated. Approaches based on demonstrated device functioning and basic phenomenologies are developed. There is no system concept developed, that is competitive with current baseline concepts. The most direct methods of conversion appear to require an initial step of production of coherent laser radiation. Other methods generally require production of electron streams for use in solid-state or cavity-oscillator systems. Further development is suggested to be worthwhile for suggested devices and on concepts utilizing a free-electron stream for the intraspace station power transport mechanism. S.L.

N82-11545*# Stonehart Associates, Inc., Madison, Conn.
SURVEY ON AGING ON ELECTRODES AND ELECTROCATALYSTS IN PHOSPHORIC ACID FUEL CELLS Progress Report
Paul Stonehart and John Hochmuth Oct. 1981 73 p refs
(Contract DEN3-176)
(NASA-CR-165505; DOE/NASA/0176-81/3) Avail: NTIS HC A04/MF A01 CSCL 10A

The processes which contribute to the decay in performance of electrodes used in phosphoric acid fuel cell systems are discussed. Loss of catalytic surface area, corrosion of the carbon support, electrode structure degradation, electrolyte degradation, and impurities in the reactant streams are identified as the major areas for concern. J.M.S.

N82-11546*# Spire Corp., Bedford, Mass.
PROCESSING OF SILICON SOLAR CELLS BY ION IMPLANTATION AND LASER ANNEALING Final Report
J. A. Minnucci, K. W. Matthei, and A. C. Greenwald Feb. 1981 78 p refs
(Contract NAS3-21276)
(NASA-CR-165283; FR-10066) Avail: NTIS HC A05/MF A01 CSCL 10A

Methods to improve the radiation tolerance of silicon cells for spacecraft use are described. The major emphasis of the program was to reduce the process-induced carbon and oxygen impurities in the junction and base regions of the solar cell, and to measure the effect of reduced impurity levels on the radiation tolerance of cells. Substrates of 0.1, 1.0 and 10.0 ohm-cm float-zone material were used as starting material in the process sequence. High-dose, low-energy ion implantation was used to form the junction in n+p structures. Implant annealing was performed by conventional furnace techniques and by pulsed laser and pulsed electron beam annealing. Cells were tested for radiation tolerance at Spire and NASA-LeRC. After irradiation by 1 MeV electrons to a fluence of 10 to the 16th power per sq cm, the cells tested at Spire showed no significant process induced variations in radiation tolerance. However, for cells tested at Lewis to a fluence of 10 to the 15th power per sq cm, ion-implanted cells annealed in vacuum by pulsed electron beam consistently showed the best radiation tolerance for all cell resistivities. Author

N82-11547*# Munising Paper Div., Neenah, Wis.
DEVELOPMENT OF BATTERY SEPARATOR COMPOSITES Final Report, Oct. 1976 - Nov. 1981
George F. Schmidt and Robert E. Weber Nov. 1981 56 p refs
(Contract NAS3-20583)
(NASA-CR-165508) Avail: NTIS Hc A04/MF A01 CSCL 10C

Improved inorganic-organic separators developed by NASA were commercially prepared. A single-ply asbestos substrate was developed, as well as alternative substrates based on cellulose and on polypropylene fibers. The single-ply asbestos was bound with butyl rubber and was functionally superior to the formerly used polyphenylene oxide saturated sheet. Commercially prepared separators exhibited better measured separator properties than the NASA standard. Cycle life in Ni/Zn and Ag/Zn cells was related to substrate, decreasing in the order; asbestos > cellulose paper > nonwoven polypropylene. The cycle life of solvent-coated separators was better than aqueous in Ni/Zn cells, while aqueous coatings were better in Ag/Zn cells. T.M.

N82-11548*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE EFFECTS OF IMPURITIES ON THE PERFORMANCE OF SILICON SOLAR CELLS
K. A. Yamakawa 1 Sep. 1981 75 p refs
(Contracts NAS7-100; EX-76-A-29-1012; DE-AI01-76ET-20356)
(NASA-CR-164945; JPL-Pub-81-76; DOE/JPL-1012-57) Avail: NTIS HC A04/MF A01 CSCL 10A

The major factors that determine the tolerable concentrations of impurities in silicon feedstock for solar cells used in power generation are discussed in this report. It is concluded that a solar-grade silicon can be defined only for a specific manufacturing process. It is also concluded that it is the electrical effects, efficiency and resistivity, that are dominant in determining tolerable concentrations of impurities in the silicon feedstock. Crystal growth effects may become important when faster growth rates and larger crystal diameters are developed and used. Author

N82-11549*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IRRIGATION MARKET FOR SOLAR THERMAL PARABOLIC DISH SYSTEMS
Hamid Habib-agahi and Sue Campbell Jones 1 Sep. 1981 40 p refs
(Contracts NAS7-100; DE-AT04-81AL-16228)
(NASA-CR-164955; JPL-Pub-81-85; DOE/JPL-1060-49) Avail: NTIS HC A03/MF A01 CSCL 10A

The potential size of the onfarm-pumped irrigation market for solar thermal parabolic dish systems in seven high-insolation states is estimated. The study is restricted to the displacement of three specific fuels: gasoline, diesel and natural gas. The model was developed to estimate the optimal number of parabolic dish modules per farm based on the minimum cost mix of conventional and solar thermal energy required to meet irrigation needs. The study concludes that the potential market size for onfarm-pumped irrigation applications ranges from 101,000 modules when a 14 percent real discount rate is assumed to 220,000 modules when the real discount rate drops to 8 percent. Arizona, Kansas, Nebrasks, New Mexico and Texas account for 98 percent of the total demand for this application, with the natural gas replacement market accounting for the largest segment (71 percent) of the total market. Author

N82-11550*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SECONDARY AND COMPOUND CONCENTRATORS FOR PARABOLIC DISH SOLAR THERMAL POWER SYSTEMS
L. D. Jaffe and P. T. Poon 15 Apr. 1981 47 p refs Sponsored in part by DOE
(Contract NAS7-100)
(NASA-CR-164960; JPL-Pub-81-27; DOE/JPL-1060-43) Avail: NTIS HC A03/MF A01 CSCL 10A

A secondary optical element may be added to a parabolic dish solar concentrator to increase the geometric concentration ratio attainable at a given intercept factor. This secondary may be a Fresnel lens or a mirror, such as a compound elliptic concentrator or a hyperbolic trumpet. At a fixed intecept factor, higher overall geometric concentration may be obtainable with a long focal length primary and a suitable secondary matched to it. Use of a secondary to increase the geometric concentration ratio is more likely to e worthwhile if the receiver temperature is high and if errors in the primary are large. Folding the optical path with a secondary may reduce cost by locating the receiver and power conversion equipment closer to the ground and by eliminating the heavy structure needed to support this equipment at the primary focus. Promising folded-path configurations inclue the Ritchey-Chretien and perhaps some three element geometries. Folding the optical path may be most useful in systems that provide process heat. Author

N82-11551*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SOLAR CELL DEVELOPMENT FOR THE POWER EXTENSION PACKAGE
Cosmo R. Baraona and James L. Cioni (NASA, Johnson Space Center) 1981 8 p refs Presented at the 16th Intersoc. Energy Conversion Conf., Atlanta, 9-14 Aug. 1981
(NASA-TM-82685; E-922) Avail: NTIS HC A02/MF A01 CSCL 10A

The PEP is a 32 kilowatt flexible substrate, retrievable, solar array system for use on the Space Shuttle. Solar cell costs will be reduced by increasing cell area and simplifying cell and coverglass fabrication processes and specifications. The cost goal is to produce cells below $30 per watt. Two and ten ohm-cm silicon cells were investigated. In phase I of the cell development program a few thousand candidate cells will be produced and evaluated for utility and quality. In phase II a large number of cells will be fabricated to verify production readiness and cell yields and costs. This schedule is compatible with PEP initial operational capability in 1984. Approximately 140,000 large area (5.9 x 5.9 cm) cells will be required for two PEP solar arrays. The status of the cell development and testing, including a radiation damage test and side-by-side comparison of candidate cell types with pre- and post-irradiation airplane calibration of outer space short-circuit current, is reported. T.M.

N82-11552# EIC, Inc., Newton, Mass.
INVESTIGATION OF LITHIUM SULFUR DIOXIDE (LI/SO2) BATTERY SAFETY HAZARD Quarterly Report, 24 Dec. 1980 - 23 Mar. 1981
M. W. Rupich and K. M. Abraham May 1981 26 p refs
(Contract N60921-81-C-0084)
(AD-A104326) Avail: NTIS HC A03/MF A01 CSCL 10/3

The lithium/sulfur dioxide primary electrochemical cell has received considerable attention as a high energy power source in the last decade. However, during the same time a number of safety hazards have been associated with its use. This report is the initial part of a research-oriented investigation intended to identify and document present Li/SO2 safety hazards, then to identify the chemical reactions responsible for these hazards, and finally to investigate methods of controlling them. This report presents the results of a survey of the safety hazards associated with Li/SO2 cells. The report documents specific safety incidents experienced with Li/SO2 cells, presents some of the causes identified or postulated for the incidents, and identifies general aspects of Li/SO2 use presently believed to be potentially hazardous. The survey was carried out by reviewing safety studies and reports of safety incidents appearing in the literature and by gathering unpublished information of the experiences of users of Li/SO2 cells in both government and industry. The results of the report can serve as basis for deciding which aspects of the Li/SO2 safety hazard at present need further investigation. GRA

N82-11553# Midwest Research Inst., Golden, Colo.
CADMIUM SULFIDE/COPPER SULFIDE HETEROJUNCTION CELL RESEARCH BY SPUTTER DEPOSITION Quarterly Technical Progress Report, 1 Dec. 1980 - 28 Feb. 1981
J. A. Thornton, W. W. Anderson (Lockheed Palo Alto Research Lab.), and John D. Meakin (Delaware Univ., Newark) 3 Apr. 1981 50 p refs
(Contract DE-AC02-77CH-00178)
(DE81-026219; SERI/PR-9296-T1) Avail: NTIS HC A03/MF A01

Photoluminescence spectral measurements on 6000 nm thick reactive sputtered CdS coatings yielded exciton and green edge emission spectra which are similar in their general character to those recorded from the evaporated CdS that yields high performance cells. All-sputter-deposited cells with composite doped and undoped CdS layers yielded J/sub sc/ approx. 3 mA/cm(2). This Cu2S reactive sputtering experiments further elucidated the influence of cathode and wall conditioning on the deposition process. The resistivities of CdS coatings deposited using the planar magnetron are typically a factor of from three to ten lower than for coatings deposited using the cylindrical magnetrons. DOE

N82-11554# Arkansas Univ., Fayetteville.
MISSISSIPPI COUNTY COMMUNITY COLLEGE SOLAR PHOTOVOLTAIC PROJECT Final Report
F. K. Deaver, M. M. Johnson, Tom Pugh, Ray Snowden, W. D. Turner, J. D. Wall, J. G. Williams, and J. R. Yeargan Nov. 1980 256 p refs
(Contract DE-FG05-77CS-20347; Grant EG-77-G-05-5565)
(DE81-030669; DOE/ET-20347/T1) Avail: NTIS

HC A12/MF A01

A weather station was maintained from April 1978 to April 1980. Daily totals of direct normal and global insolation are given, and an hour-by-hour printout of direct normal, global, and diffuse solar radiation for the entire two year period is included. A number of studies were conducted, including daylighting, energy conservation and management, design tradeoffs, and landscaping. The collector selection process included the writing of specifications, providing design data, reviewing the various collector designs, inspecting potential vendor facilities, monitoring on-site tests, and the final selection. A simulation was made of the entire system, including both an electrical and thermal simulation of the photovoltaic array and a thermal simulation of the various buildings. Example printouts of the simulations are included. DOE

N82-11555# Oak Ridge National Lab., Tenn. Energy Div.
DATA COLLECTION AND PROCESSING FOR THE ACES
J. L. Bledsoe and D. R. Miller Aug. 1981 167 p refs
(Contract W-7405-eng-26)
(DE81-030630; ORNL/CON-59) Avail: NTIS HC A08/MF A01

The computer codes used for processing and analyses were designed to display collected data; to summarize the performance (mechanical) of the house for each week; to give representation of external influences such as temperature, humidity ratio, and wind speed; and to aid in the dissemination of data to other users. Revisions and adjustments were made to the codes to accommodate improvements made at the demonstration facility. The codes are written in either FORTRAN IV or PL/I programming languages. All programs in the system run on the IBM 360 systems. DOE

N82-11556# Sandia Labs., Albuquerque, N. Mex.
HELIOSTAT OPERATION AT THE CENTRAL RECEIVER TEST FACILITY (1978 - 1980)
J. T. Holmes Jul. 1981 25 p refs
(Contract DE-AC04-76DP-00789)
(DE81-031926; SAND-81-0275-Rev) Avail: NTIS HC A02/MF A01

The CRTP beam produces a total power of 5.5 MWth and a peak intensity of 2250 kW/sq m near solar noon. A safe operating strategy was implemented. Improvements in the targeting accuracy were made. The mirror reflectivity is maintained near 80% by cleaning with natural rains or snow. The CRTF heliostats logged almost 300,000 operating hours by the end of 1980. DOE

N82-11557# RCA Labs., Princeton, N. J.
AMORPHOUS BORON-SILICON-HYDROGEN ALLOYS FOR THIN-FILM HETEROJUNCTION SOLAR CELLS Quarterly Technical Progress Report, 1 Sep. - 30 Nov. 1980
A. R. Moore, D. E. Carlson, and R. W. Smith May 1981 18 p refs
(Contract DE-AC02-77CH-00178)
(DE81-027234; SERI/PR-0-9010-2; QTPR-2) Avail: NTIS HC A02/MF A01

The conductivity of a-B:Si:H films increases with substrates temperature and annealing temperature for temperatures up to 5000 C (highest investigated). However, increasing the conductivity causes the optical gap to decrease. Preliminary results on a-B:Si:H/a-Si:H heterojunction devices are not encouraging as interface states appear to limit the conversion efficiency to approx. 1.5%. DOE

N82-11558# RCA Labs., Princeton, N. J.
AMORPHOUS BORON-SILICON-HYDROGEN ALLOYS FOR THIN-FILM HETEROJUNCTION SOLAR CELLS Quarterly Technical Progress Report, 1 Dec. 1980 - 28 Feb. 1981
A. R. Moore, D. E. Carlson, and R. W. Smith Jun. 1981 18 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-77CH-00178)
(DE81-027254; SERI/PR-0-9010-3; QTPR-3) Avail: NTIS HC A02/MF A01

Amorphous boron-silicon-hydrogn (a-B:Si:H) alloys were used to make heterojunction contacts to hydrogenated amorphous silicon (a-Si:H) films. The performance of a-B:Si:H/a-Si:H heterojunction cells are limited mainly by a large density of interface states. Another p-type, wide bandgap material, microcrystalline silicon-carbon-hydrogen (M-Si:C:H) was investigated. Three techniques are explored for production of m-Si:C:H films: glow discharge deposition, thermal annealing of a-Si:C:H films, and laser annealing of a-Si:C:H: films. DOE

N82-11559# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
OPTICAL TRANSPARENCY OF INEXPENSIVE SALT SOLUTIONS FOR CONSTRUCTION OF DENSITY-GRADIENT PONDS
John D. Webb Jul. 1981 54 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-030832; SERI/RR-641-615) Avail: NTIS HC A04/MF A01

A laboratory testing protocol was developed that will permit a comparative evaluation of the optical performance of candidate salts for use in stabilizing solar ponds. Extinction coefficients measured for the salts and for water in dual-beam spectrophotometer fitted with 10-cm quartz sample cells were input to a digital model that convolutes a solar spectrum with an assumed salt/water concentration gradient similar to that to be established in the solar pond. The model determined the fraction of available solar energy transmitted to the pond storage layer. This information was used to estimate the size of the pond needed to meet a given set of thermal demands if the candidate salt were to be used. DOE

N82-11560# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
SOLAR ENERGY SYSTEM PERFORMANCE EVALUATION: FOREST CITY DILLON, WASHINGTON, D.C., JANUARY 1980 - DECEMBER 1980
D. W. Missal 1980 82 p refs
(Contract DE-AC02-79CS-30027)
(DE81-028174; SOLAR/1041-81/14) Avail: NTIS HC A05/MF A01

An active solar energy system consisting of single glazed flat plate collectors, 3200 gallons of storage liquid, and an auxiliary oil fired boiler, was designed to supply 59% of the hot water demand for a high rise apartment building. The annual solar fraction predicted by the f chart simulation was 37%, and the solar fraction measured was 32%. Other measures of performance, including solar system coefficient of performance, are given. The performance of the collector, storage, and domestic hot water subsystems is discussed. DOE

N82-11561# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
SOLAR ENERGY SYSTEM PERFORMANCE EVALUATION: MONTECITO PINES, SANTA ROSA, CALIFORNIA, NOVEMBER 1979 - APRIL 1980
E. N. Ashman 1980 80 p refs
(Contract DE-AC01-79CS-30027)
(DE81-028175; SOLAR/1045-80/14) Avail: NTIS HC A05/MF A01

An active solar energy system consisting of 950 square feet of flat plate collectos, gas fired auxiliary boilers, and 2000 gallons of storage was designed. The solar fractions actually achieved were 11% for heating and 44% for hot water. Measures of performance are given, including; solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance. The performance of the collector, storage, space heating and domestic hot water subsystems are discussed. DOE

N82-11562# Teledyne Energy Systems, Timonium, Md.
ADVANCED SELENIDE THERMOELECTRIC DEVELOPMENT PROGRAM Final Report
W. R. Seetoo 20 Jul. 1981 40 p
(Contract DE-AC01-80ET-32075)
(DE81-027823; TES-32075-107) Avail: NTIS HC A03/MF A01

The segmentation of copper silver selenide and TAGS production of CuAgSe powder by rapid solidification was demonstrated. The hot junction temperature was 7250C with the segmentation temperature of 4000C, both temperatures were selected to prevent excessive sublimation from the hot

ends of the segments, respectively. The CuAgSe that was used to fabricate the test hardware was synthesized. Both the CuAgSe and TAGS were hot pressed in an argon atmosphere then the segments were furnacebonded to each other. DOE

N82-11563# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THERMAL AND ELECTROCHEMICAL BIOMASS CONVERSION AT SERI
T. B. Reed, T. Milne, R. Desrosiers, J. Diebold, and H. Chum May 1981 22 p refs
(Contracts EG-77-C-01-3042; DE-AC02-77CH-00178)
(DE81-030507; SERI/TP-622-1174) Avail: NTIS HC A02/MF A01

Biomass of the world which occurs in a relatively dry form and is most accessible to nonbiological methods of conversion to various energy forms is discussed. The biomass thermal conversion by various conversion processes is evaluated. New processes for the conversion of biomass to fuels and chemicals are developed. DOE

N82-11564# McDonnell-Douglas Corp., Huntington Beach, Calif.
SECOND GENERATION HELIOSTAT, VOLUME 1 Final Report
D. A. Steinmeyer Apr. 1981 428 p Prepared for Sandia Labs., Livermore, Calif. 2 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-029618; SAND-81-8177-Vol-1) Avail: NTIS HC A19/MF A01

The heliostat subsystem design is described. The test program is summarized, including component testing, subsystem operation and the shipment and installation. The production heliostat description, the manufacturing process definitions, and the manufacturing facility definition are summarized. The installation, operations, and maintenance requirements for the 50 MWe field are reviewed. Future development activities aimed at further cost reduction are discussed. DOE

N82-11565# McDonnell-Douglas Corp., Huntington Beach, Calif.
SECOND GENERATION HELIOSTAT. VOLUME 2: DEFINITION OF A HELIOSTAT MANUFACTURING FACILITY Final Report
Apr. 1981 183 p Prepared in cooperation with General Motors Technical Center and Lamb (F. Joseph) Co., Warren, Mich. Prepared for Sandia Labs., Livermore, Calif. 2 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-029824; SAND-81-8177-Vol-2; MDC-G9490) Avail: NTIS HC A09/MF A01

The heliostat design is described an the definition of a heliostat manufacturing facility capable of producing 50,000 heliostats per year and to generate the manufacturing costs associated with that level of production was studied. The heliostat plant site, plant layout, and cost of the plant are discussed. The manufacture of heliostats, including special requirements for the heliostat mirror, and production costs are given. DOE

N82-11566# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 1: EXECUTIVE REPORT. VOLUME 2: PROJECT BACKGROUND Final Report
James B. Ayers Jul. 1981 269 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles 5 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-030982; SAND-81-7014-Vol-1; SAND-81-7014-Vol-2) Avail: NTIS HC A12/MF A01

Two models used for estimating installation costs for residential and intermediate photovoltaic energy systems are summarized. The modeling rationale is reviewed, and the results obtained when the models were applied to 10 residential and 10 intermediate PV systems are listed. Output reports for each of the test cases are appended. DOE

N82-11567# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 3: SANDIA NATIONAL LABORATORIES PHOTOVOLTAIC SYSTEMS DESIGN CATALOG Final Report
James B. Ayers Jul. 1981 207 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles
(Contract DE-AC04-76DP-00789)
(DE81-030986; SAND-81-7014-Vol-3) Avail: NTIS HC A10/MF A01

Basic system data sheets, which include project title and location, prime contractor, PV system general description, and energy storage capacity, are shown for 29 intermediate PV systems and 19 residential PV systems. In addition, cost data and output reports generated by TB and A's PV installation cost models are included for 10 intermediate systems and 10 residential systems. DOE

N82-11568# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 4: INSTALLATION COST MODEL FOR RESIDENTIAL PV SYSTEMS: USERS MANUAL Final Report
James B. Ayers Jul. 1981 89 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles 5 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-031921; SAND-81-7014-Vol-4) Avail: NTIS HC A05/MF A01

A quantitative methodology is presented for estimating installation costs of residential photovoltaic systems. The installation cost model for residential PV systems is comprised of 144 estimating equations selectively exercised, based on user definition of the system. At the input stage, residential PV systems can be fully described by 9 design option categories and 9 system specification categories. All assumptions were validated with installers of solar thermal systems. A discussion of the model is included as well as an example of its use with an 8 KW PV system for a Southwest all-electric residential design. DOE

N82-11569# Sandia Labs., Livermore, Calif.
STUDY OF PHOTOVOLTAIC COST ELEMENTS. VOLUME 5: INSTALLATION COST MODEL FOR INTERMEDIATE PV SYSTEMS: USERS MANUAL Final Report
James B. Ayers Jul. 1981 137 p Prepared in cooperation with Barry (Theodore) and Associates, Los Angeles 5 Vol.
(Contract DE-AC04-76DP-00789)
(DE81-030981; SAND-81-7014-Vol-5) Avail: NTIS HC A07/MF A01

A cost modeling methodology is presented for estimating installation costs associated with intermediate photovoltaic (PV) systems. With only a parametric description of an intermediate power system, the model can be used to develop an installation cost estimate for that system. The model is based on conventional cost-estimating procedures widely used by the construction industry and was validated by comparing estimates for the same 10 systems made independently by a cost engineering firm. A description of the model is included as well as an example of its use with a 200 KW solar breeder plant design to be located in Rockville, Maryland. DOE

N82-11570# Sandia Labs., Albuquerque, N. Mex.
SECOND GENERATION HELIOSTAT PROGRAM, SEPTEMBER 1979-MARCH 1981
Apr. 1981 15 p Prepared for Sandia Labs., Livermore, Calif.
(Contract DE-AC04-76DP-00789)
(DE81-029752; SAND-81-8177-Exec-Summ) Avail: NTIS HC A02/MF A01

A production design and production plans for the MDAC heliostat are summarized, testing, maintenance, the production facility, volume heliostat price, and possible future cost reduction. DOE

N82-11571# Aerojet Energy Conservation Co., Sacramento, Calif.
FLUID-BED HEAT-EXCHANGER OPTIMIZATION AND BED MATERIALS SELECTION Final Report
Feb. 1981 127 p refs
(Contracts DE-AC22-78ET-11343; DE-AC03-79ET-11343; ET-78-C-03-2039)
(DOE/ET-11343/T2; Rept-8100-FB-0003) Avail: NTIS HC A07/MF A01

The effect of material properties on heat exchanger costs for waste gas streams from 500 to 30000F was evaluated. The cost of the major heat exchanger components was identified and related directly to bed material properties. Two hundred materials were reviewed: metals, alloys, oxides, minerals,

carbides, borides, intermetallics, and cermets. It is shown that the oxides and minerals were the most cost effective at the lower bed temperatures and the metallic bed materials at the higher bed temperature. DOE

N82-11572# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
REVIEW OF THERMALLY REGENERATIVE ELECTROCHEMICAL SYSTEMS, VOLUME 2
Helena I. Chum and Robert A. Osteryoung (State Univ. of New York at Buffalo) Apr. 1981 223 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE81-029624; SERI/TR-332-416-Vol-2) Avail: NTIS HC A10/MF A01

Thermally regenerative electrochemical systems(TRES) are reviewed and classified according to the type of energy input required to regenerate the electrochemical cell reactants: either thermal input alone or the coupling of thermal and electrolytic energy inputs. These two broad categories are further divided into seven types of TRES according to significant differences either the electrochemical cells or in the regenerators. DOE

N82-11573# Argonne National Lab., Ill. Energy and Environmental Systems Div.
PRELIMINARY EVALUATION OF ADVANCED COAL-BASED ELECTRICITY-GENERATING TECHNOLOGIES BY MEANS OF SYSTEM-INTEGRATION ANALYSIS
J. L. Gillette and K. Hub Apr. 1981 41 p refs
(Contract W-31-109-eng-38)
(DE81-029989; ANL/EES-TM-144) Avail: NTIS HC A03/MF A01

The potential effects of coal fired cogeneration on production requirements were examined. Two types of cogeneration designs, a backpressure turbine and an extraction turbine were studied. It is found that some savings of oil can be realized with coal based cogeneration, and that the quantity of such is dependent on the purchase option, the demand growth rate, and the cogenerator design. It is concluded that of the two designs the backpressure turbine type has an advantage due to its significantly lower heat rate. DOE

N82-11574# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
ENERGY ANALYSIS OF HUMAN ECOSYSTEMS IN AN APPALACHIAN COAL COUNTY
A. P. Watson 1980 31 p refs Presented at the Intern. Symp. on the Human Side of Energy, Laramie, Wyo., 7-9 Jul. 1981
(Contract W-7405-eng-26)
(DE81-025177; CONF-8007107-2) Avail: NTIS HC A03/MF A01

Preliminary results from a energy analysis of the coal fuel cycle in an Appalachian coal county has provided systematic assessment of hidden energy subsidies in extraction, transport, processing, and combustion. Current results indicate a major loss due to depletion of the coal resource base by use of inefficient mining techniques. Although of smaller magnitude, reductions in work force and community productivity from occupational accidents and disease and road maintenance requirements for transport also appear to be significant. DOE

N82-11575# Brookhaven National Lab., Upton, N. Y.
IMPURITY EFFECTS IN a-Si:H SOLAR CELLS
A. E. Delahoy and R. W. Griffith 1981 10 p refs Presented at 15th IEEE Photovoltaic Specialists Conf., Orlando, Fla., 12-15 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-025069; BNL-29668; CONF-810526-38) Avail: NTIS HC A02/MF A01

The deleterious effects on device performance of phosphine and monochlorosilane are discussed. Solar cells fabricated using plasma deposited a-Si:H alloys can be degraded by the incorporation of certain impurities during deposition of the a-Si:H materials. Nominally intrinsic layers are adversely affected by the addition to the plasma of air, N2 + O2 mixtures, PH3 or SiH3Cl (monochlorosilane). Modification of the a-Si:H gap state density owing to synergistic effects of oxygen and nitrogen in the plasma leads to a collapse of the space charge region and the reduction of the micro tau product for holes. DOE

N82-11576# Sandia Labs., Livermore, Calif.
DESIGN, COST AND PERFORMANCE COMPARISONS OF SEVERAL SOLAR THERMAL SYSTEMS FOR PROCESS HEAT. VOLUME 1: EXECUTIVE SUMMARY
Patrick J. Eicker, Ernest D. Eason, Joe D. Hankins, Larry D. Hostetler, Joseph J. Iannucci, and James B. Woodward Mar. 1981 24 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029881; SAND-79-8279-Vol-1) Avail: NTIS HC A02/MF A01

Conceptual designs of central receiver, parabolic dish, and parabolic trough systems for several process heat applications were analyzed. Cost and performance estimates are made for each of these designs and used to calculate levelized delivered process heat costs. This indicated that central receiver systems will provide energy costs competitive with that afforded by the parabolic trough and parabolic dish systems over the range of demand sizes and temperatures studies. DOE

N82-11577# Delaware Univ., Newark. Inst. of Energy Conversion.
Zn3P2 AS AN IMPROVED SEMICONDUCTOR FOR PHOTOVOLTAIC SOLAR CELLS Quarterly Report, 1 Dec. 1980 - 28 Feb. 1981
1981 49 p refs Prepared of Midwest Research Inst.
(DE81-025587; SERI/PR-8062-1-T12; QR-10) Avail: NTIS HC A03/MF A01

Zinc oxide zinc solar cells heterojunction devices were studied to establish the origin of the low open circuit voltage. Activation energy determination from JO vs. T-measurements, dark current voltage characteristics, and diffusion volage determination by high frequency capacitance voltage measurements are investigated development oriented Zn3P2 crystals is reported. The optical absorption and photoluminescence spectra of Mg3P2 was measured, and the diffusion by coefficient of magnesium in Zn3P2 was measured at 750C and 1500C by spectral response method. Diffusion of aluminum is also measured. The diffusion voltage of p/n junction devices to improving the fill factor is reported. DOE

N82-11578# Argonne National Lab., Ill. Chemical Engineering Div.
CALCIUM/METAL SULFIDE BATTERY DEVELOPMENT PROGRAM Progress Report, Oct. 1979 - Sep. 1980
D. L. Barney, M. F. Roche, S. K. Preto, L. E. Ross, N. C. Otto, and F. J. Martino Mar. 1981 24 p refs Prepared for California Univ., Lawrence Berkeley Lab.
(Contract W-31-109-eng-38)
(ANL-81-14) Avail: NTIS HC A02/MF A01

Components needed to fabricate a high performance calcium cell were identified. The components are: (1) Ca-Al-Si negative electrode; (2) Fe sub 0.93 Co sub 0.075 sub 2 positive electrode; (3) Bn felt separator; (4) iron negative and molybdenum positive current collectors; and (5) LiCl-NaCl-CaCl2-BaCl2 electrolyte. E.A.K.

N82-11579# Argonne National Lab., Ill. Integrated Assessments and Policy Evaluation Group.
ANALYSIS OF THE FUEL AND COST EFFECTS OF INTERFACING UTILITIES AND SMALL-POWER COGENERATORS
K. Hub, J. VanKuiken, and W. Marr Dec. 1980 32 p refs
(Contract W-31-109-eng-38)
(DE81-028495; ANL/CNSV-TM-77) Avail: NTIS HC A03/MF A01

Small coal- and oil-fueled cogenerators were evaluated for their performance in coal- and oil-based utility systems. The impact of interconnected cogenerators on utility systems' fuel use, reliability, and costs was studied. Potential benefits from cogeneration were strongly influenced by cogenerator design options and by characteristics of the utility systems. DOE

N82-11580# Varta Batterie A.G., Kelkheim (West Germany).
RECENT ADVANCES IN LEAD-ACID CELL RESEARCH AND DEVELOPMENT

Ernst Voss 1980 38 p refs Presented at the EVA Conf., Adelia, Australia, 25-29 Aug. 1980 Sponsored in part by Bundesministerium fuer Forschung und Technologie Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE81-023104; CONF-8008118-1) Avail: NTIS HC A03/MF A01

During the last decade it was demonstate that the lead-acid system is capable of proving an attractive energy source of sufficient energy and power per unit weight and volume which allows its sucessful application for electric vehicle propulsion. This is shown by a number of typical examples, such as the relationship between active-material properties and capacity at high rates of discharge the effect of acid stratification and others. Simultaneously, the expenditure for the maintenance of lead-acid batteries was minimized by the development of peripheric equipment, as there are means for central-automatic water refill and recombination devices. It is shown that there is still a considerable potential for further improvement which might again strengthen the unique position of the lead-acid system in the market in comparison to competitive systems. T.M.

N82-11581# Ames Lab., Iowa.
HODGES RESIDENCE: PERFORMANCE OF A DIRECT GAIN PASSIVE SOLAR HOME IN IOWA
L. Hodges 1980 3 p refs Presented at the 5th Natl. Passive Solar Conf., Amherst, Mass., 19-26 Oct. 1980
(Contract W-7405-eng-82)
(DE81-025528; IS-M-352; CONF-801016-25) Avail: NTIS HC A02/MF A01

No night insulation was used on its 500 square feet of double-pane glass. Total auxiliary heat required was 43 GJ (41 MBTU) gross and 26 GJ (25 MBTU) net, amounting, respectively, to 60 and 36 kJ/C-day-sq m. The heating season was unusually cloudy and included the cloudiest January in the 21 years of Ames insolation measurements. Results are also presented for the performance of the hollow-core floor which serves as the main storage mass and for the comfort range in the house. DOE

N82-11582# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
OXYGEN REDUCTION ON CARBON-SUPPORTED PLATINUM FUEL-CELL ELECTRODES IN H SUB 3 PO SUB 4
J. McBreen, H. Lender, and S. Srinvasan 1981 11 p refs Presented at the Symp. on Electrocatalysts, Minneapolis, 10-15 May 1981; sponsored by Electrochemical Society, Inc.
(Contract DE-AC02-76CH-00016)
(DE81-027303; BNL-29788; CONF-8105105-2) Avail: NTIS HC A02/MF A01

The reduction of oxygen on carbon supported fuel cell electrodes was investigated in phosphoric acid electrolytes in the concentration range of 85% to 101% and at temperatures from 25 to 180 C. In purified acid the Tafel slope in the potential region of 0.7 to 0.9 V RHE is approx. 120 mV/decade and is invariant with temperature. The activation energy for oxgyen reduction is between 8 kcal and 13 kcal/mole. In impure 101% electrolyte the Tafel slope increases from a value of 85 mV/decade at 80 C to 105 mV/decade at 180 C and the activation energy is 18.29 kcal/mole. The major discrepancies in the literature can be rationalized on the basis of impurity effects. In pure electrolytes, the kinetic parameters on smooth platinum and high area carbon supported platinum are the same. DOE

N82-11583# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
SOLAR HEAT PUMP SIMULATOR
M. A. Catan 1981 5 p refs Presented at the Active Solar Contractors' Rev. Meeting, Washington, D.C., Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-024368; BNL-29678; CONF-810912-3) Avail: NTIS HC A02/MF A01

A simulator was utilized to provide controlled-temperature sources and sinks to an experimental water-to-water laboratory heat pump test bed. This combination was used to demonstrate and explore the potential of the vapor-compression cycle to deliver high COP's at SAHP source temperatures. Results from the simulator were used in computer simulations of complete systems performed by BNL, by the SAHP contractors, and by others. A two-speed compressor was first tested at high source temperatures on the BNL simulator. In view of the decision by both contractors to construct water-to-air (rather than water-to-water) heat pumps, the BNL simulator was fitted with an air-side test loop. The prototype heat pump was tested under steady-state conditions on the BNL simulator. DOE

N82-11584# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
LOW-COST SOLAR FLAT-PLATE-COLLECTOR DEVELOPMENT
W. G. Wilhelm 1981 5 p Presented at the Active solar Contractors' Rev. Meeting, Washington, D.C., Sep. 1981
(Contract DE-AC02-76CH-00016)
(DE81-025081; BNL-29680; CONF-810912-4) Avail: NTIS HC A02/MF A01

Cost goals were developed for the collector which led to the rejection of conventional approaches and to the exploration of thin film technology. A thin film solar absorber suited for high speed continous-roll manufacture at low cost was designed. The absorber comprises two sheets of aluminum-foil/polymeric-material laminate bonded together at intervals to form channels with water as the heat transfer fluid. Several flat-plate panels were fabricated and tested. DOE

N82-11585# Brown Univ., Providence, R. I.
ANALYSIS OF THERMAL/MECHANICAL ENERGY-CONVERSION CONCEPTS Final Report
R. DiPippo, J. Kestin, and P. F. Maeder Jun. 1981 15 p refs
(Contract DE-AS02-76ET-28320)
(DE81-027854; DOE/ET-28320/48) Avail: NTIS HC A02/MF A01

A list of project activities, meetings, and publications is presented. DOE

N82-11586# AiResearch Mfg. Co., Torrance, Calif.
LIGHT-COMMERCIAL BRAYTON/RANKINE SPACE-CONDITIONING SYSTEM
David Friedman, Kenneth Trester, and Wiley Cowell 1981 7 p ref Presented at the DOE Heat Pump Contractors' Program Integration Meeting, McLean, Va., 2-4 Jun. 1981 Submitted for publication
(Contract W-7405-eng-26)
(DE81-024137; CONF-810672-6) Avail: NTIS HC A02/MF A01

A heat-actuated space conditioning system that provides more efficient use of natural gas developed for 26.4- to 87.8-kW-(7.5- to 25-ton) commercial applications is described. The system consists of a subatmospheric naturalgas-fired, Brayton-cycle engine that drives a Rankine-cycle heat pump. A centrifugal Freon compressor is driven directly from the Brayton engine rotating group thorugh a permanent-magnet coupling. Unique features that offer high life-cycle performance include a hermetically sealed magnetic coupling, air foil bearings, an atmospheric in-line combuster, and a high-temperature recuperator. Predicted overall engine efficiency is 27% and predicted overall coefficient of performance (COP) at he energy source is 1.0 in cooling and 1.2 heating. Cycle description system performance predictions, energy savings and payback cost analysis, hardware development, and the program status are discussed. DOE

N82-11587# Oak Ridge National Lab., Tenn. Energy Div.
GEOTHERMAL HEAT TRANSFER, DISTRICT HEATING AND COOLING
J. W. Michel 1981 4 p refs Presented at the Heat Transfer and Heat Exchangers Workshop, Vail, Colo., 18 Jun. 1981
(Contract W-7405-eng-26)
(DE81-023195; CONF-810679-1) Avail: NTIS HC A02/MF A01

The types of geothermal systems are defined. Heat rejection and scaling problems in power cycles are mentioned and other heat transfer areas of interest in geothermal applications are indicated. DOE

N82-11588# Princeton Univ., N. J.
IS GEOTHERMAL SIMULATION A CATASTROPHE?
V. V. Nguyen and George F. Pinder 1980 5 p refs Presented

at 6th Ann. Workshop on Geothermal Reservoir Engr., Stanford, Calif., 16-18 Dec. 1980
(DE81-026750; CONF-801233-10) Avail: NTIS HC A02/MF A01

All numerical simulators of geothermal reservoirs depend upon an accurate representation of the thermodynamics of steam-water systems. These relationships are required to render tractable the system of balance equations derived from the physics of flow through porous media. While it is generally recognized that steam-water system (i.e., two phase) is not thermodynamic equilibrium, equilibrium thermodynamics are employed in its description. An alternative view based on non-equilibrium thermodynamics is presented. The underpinnings of this approach are found in a branch of topology generally referred to as catastrophe theory. DOE

N82-11589# Brookhaven National Lab., Upton, N. Y. National Center for Analysis of Energy Systems.
MODELING ENERGY-CONSERVATION POTENTIALS OF COMMUNITY ENERGY-SYSTEM TECHNOLOGIES
Peter I. Kleeman 1981 8 p refs Presented at 12th Ann. Pittsburg Conf. on Modeling and Simulation, 30 Apr. - 1 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-026059; BNL-29720; CONF-810477-2) Avail: NTIS HC A02/MF A01

A mathematical model is presented for estimating energy-conservation potentials of community-energy-system technologies in meeting community energy service demands. The model is formulated to identify optimal community composition, technology choices, and fuel use under various fuel price, energy service demand, and other system-parameter assumptions. DOE

N82-11590# Franklin Associates, Prairie Village, Kans.
PRELIMINARY DEVELOPMENT OF A TECHNIQUE FOR ESTIMATING MUNICIPAL-SOLID-WASTE GENERATION
Jun. 1981 84 p refs
(Contract DE-AC01-78CE-24390)
(DE81-024152; DOE/CE-24390/1) Avail: NTIS HC A05/MF A01

The data obtained revealed detailed generation quantities by collection route for defined areas of the cities. These data were then used to test various predictive factors. The end result of the analysis is a provisional method for estimating residential solid-waste generation by relating it to income data readily available from government documents, and a provisional method for estimating commercial solid waste generation by relating it to readily available retail sales data. The analysis of the data obtained has resulted in a residential solid-waste estimation technique that can be applied to virtualy any city or region of interest. The general approach consisted of: data collection from selected solid waste jurisdictions, the determination of devographic and socioeconomic data for each solid waste jurisdiction, and data analysis. Each stage is discussed. DOE

N82-11591# Los Alamos Scientific Lab., N. Mex.
ADVANCED DEVELOPMENT OF ELECTRICAL-ENERGY-STORAGE COMPONENTS FOR HIGH RELIABILITY APPLICATIONS
K. J. Bickford, G. H. Mauldin, and W. J. Sarjeant 1981 5 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025384; LA-UR-81-1671; CONF-810659-15) Avail: NTIS HC A02/MF A01

This program was undertaken in order to study the following: design and fabrication of prototype test capacitors; dc partial discharge analysis; repetitive charge-discharge life testing; theoretical and experimental analysis; and computer modeling. A brief overview of each of these program elements is presented. DOE

N82-11592# California Univ., Berkeley. Energy and Environment Div.
INTERNATIONAL COMPARISON OF RESIDENTIAL ENERGY USE: INDICATORS OF RESIDENTIAL ENERGY USE AND EFFICIENCY. PART 1: THE DATA BASE
Lee Schipper, Andrea Ketoff, and Stephen Meyers May 1981 129 p refs
(Contract W-7405-eng-48)
(DE81-028550; LBL-11703) Avail: NTIS HC A07/MF A01

Information is presented on the end-uses of energy in the residential sector of seven major OECD countries over the period 1960-1978. Data are presented on energy consumption by energy type and end-use for three to five different years for each country. Each year table is complemented by a set of indicators, which are assembled for the entire 20-year period at the end of each country listing. Finally, a set of key indicators from each country is displayed together in a table, allowing comparison for three periods: early (1960-63), pre-embargo (1970-73), and recent (1975-78). DOE

N82-11593# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
CONTROLS FOR SOLAR HEATING AND COOLING
M. Warren, Steven Schiller, and Michael Wahlig Jun. 1981 4 p refs Presented at the Active Solar Contractors' Rev. Meeting, Washington, D.C., Sep. 1981
(Contract W-7405-eng-48)
(DE81-025209; LBL-12751; CONF-810912-8) Avail: NTIS HC A02/MF A01

Solar heating system operation with two different operating strategies were run: direct collector to load heating and storage coupled heating. No significant improvement in system performance was found for the direct heating strategy. Simulation analysis of the interaction of the solar heating system with the building load and thermostat was completed. It is indicated that using a conventional room thermostat, large temperature swings can be expected when the storage tank is charged to a high temperature. DOE

N82-11594# California Univ., Berkeley. Lawrence Berkeley Lab.
OVERVIEW OF THE APPLIED BATTERY AND ELECTROCHEMICAL RESEARCH PROGRAM
F. McLarnon Jun. 1981 15 p Presented at the 4th DOE Battery and Electrochem. Contractors' Conf., Washington, D.C., 2 Jun. 1981
(DE81-027397; LBL-12690; CONF-810642-5) Avail: NTIS HC A02/MF A01

This purpose of this program is to provide the applied research base which supports all of DOE's electrochemical systems missions, and the general objective is to help provide batteries and electrochemical systems that can satisfy economic, performance and schedule requirements. The specific goal is to identify the most promising electrochemical technologies and transfer them to industry and/or another DOE program for further development and scale-up. DOE

N82-11595# California Univ., Berkeley. Lawrence Berkeley Lab.
RECHARGEABLE MOLTEN-SALT CELLS
Elton J. Cairns Oct. 1980 23 p refs Presented at the 158th Meeting of the Electrochem. Soc., 3rd Intern. Symp. on Molten Salts, Phys. Electrochem. Div., Hollywood, Fla., 5-10 Oct. 1980
(Contract W-7405-eng-48)
(DE81-027091; LBL-11090; CONF-8010159-12) Avail: NTIS HC A02/MF A01

Rechargeable molten-salt cells offer the opportunity for achieving higher specific energy than is available from ambient temperature cells (200 W-h/kg), and a specific power in excess of 100 W/kg. Two main of rechargeable cells employing molten salts are statistical those with a molten salt as the sole electrolyte, and those with a combination of a solid electrolyte and a molten salt electroylte. The status, recent research, and current problems for each of several systems in the above two categories are discussed. DOE

N82-11596# California Univ., Livermore. Lawrence Livermore Lab.
MECHANICAL ENERGY STORAGE TECHNOLOGY (MEST) DEVELOPMENT
Thomas M. Barlow 22 Jun. 1981 8 p refs Presented at the Mech., Magnetic, and Underground Energy Storage Ann. Contractors' Rev., Washington, D.C., 24-26 Aug. 1981
(Contract W-7405-eng-48)

(DE81-026800; UCRL-86297) Avail: NTIS HC A02/MF A01

The objectives, approaches, structure, and principal accomplishments of the flywheel technology program during FY 1981 are summarized. International flywheel-related technology and complementary efforts in the United States are reviewed. DOE

N82-11597# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

INTERFACE REACTIONS IN Mg/Zn3P2 SOLAR CELLS

L. L. Kazmerski, P. J. Ireland, and A. Catalano (Inst. of Energy Conversion) May 1981 5 p refs Presented at the 15th IEEE PV Spec. Conf., Orlando, Fla., 11 May 1981

(Contract DE-AC02-77CH-00178)

(DE81-025773; SERI/TP-611-1226; CONF-810526-30) Avail: NTIS HC A02/MF A01

The composition and chemistry of the Mg/Zn3P2 interface was studied using surface analysis techniques. For higher carrier concentrations (p> 10 to the 17th power/cu cm), a heterojunction occurs by the chemical interaction of the Mg with Zn3P2 to form Mg3P2. For lower carrier concentrations this reaction does not take place, and Mg diffuses into the Zn3P2. Diffusion coefficients of Mg in Zn3P2 are determined. Grain (crystalline) and grain boundary components of the diffusion coefficient are evaluated. These data compare very well with that reported using electron beam induced currents and spectral response measurements. DOE

N82-11598# Los Alamos Scientific Lab., N. Mex.

CORRELATION METHODS

J. D. Balcomb 1981 6 p refs Presented at 6th Natl. Passive Conf., Portland, Oreg., 8-12 Sep. 1981

(Contract W-7405-eng-36)

(DE81-025379; LA-UR-81-2003; CONF-810925-1) Avail: NTIS HC A02/MF A01

Correlation methods were developed to provide a quick and relatively simple technique for estimating the performance of passive solar systems. The correlations are done with respect to data generated from simulation models. The techniques and accuracies are described. Both the Solar Load Ratio and Un-Utilizability methods are described. The advantages and limitations of correlation methods as design tools are discussed. DOE

N82-11599# Los Alamos Scientific Lab., N. Mex.

TEST RESULTS AND ANALYSIS OF A CONVECTIVE LOOP SOLAR AIR COLLECTOR

Franz A. Biehl 1981 6 p refs Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981

(Contract W-7405-eng-36)

(DE81-028151; LA-UR-81-2252; CONF-810925-3) Avail: NTIS HC A02/MF A01

The purpose of the test program is to validate simulation model that can also be extended to other collector arrangements and to a variety of weather patterns. Details of the collector configurations, typical test results, simulation model, and comparison between test and analysis results are discussed. The good agreement between test and analysis suggests that the analytical model can be employed for sensitivity studies. A range of desirable collector lengths, based upon efficiency considerations, was determined employing the analytical model. DOE

N82-11600# Los Alamos Scientific Lab., N. Mex.

LONG-TERM PERFORMANCE OF THE HUNN PASSIVE SOLAR RESIDENCE

B. D. Hunn 1981 6 p refs Presented at 6th Natl. Passive Conf., Portland, Oreg., 8-12 Sep. 1981

(Contract W-7405-eng-36)

(DE81-028735; LA-UR-81-2251; CONF-810925-6) Avail: NTIS HC A02/MF A01

Detailed performance and annual energy consumption data are reported, as well as occupant observations and conclusions, for three heating seasons in the Hunn hybrid passive/active solar residenced located in Los Alamos, New Mexico. The performance data were gathered by the Los Alamos National Laboratory and include hourly storage wall and interior temperature data for a midwinter period, an interior air-temperature histogram, and measured auxiliary energy consumption and solar heating fraction for each heating season. Also, energy and cost savings over the three-year period are estimated. DOE

N82-11601# Los Alamos Scientific Lab., N. Mex.

ATTACHED SUNSPACE DESIGN ANALYSIS

Robert W. Jones and Robert D. McFarland 1981 6 p refs Presented at the 6th Natl. Passive Solar Conf., Portland, Oreg., 8-12 Sep. 1981

(Contract W-7405-eng-36)

(DE81-028738; LA-UR-81-2206; CONF-810925-2) Avail: NTIS HC A02/MF A01

The 28 sunspace reference designs are described. Note is taken of those designs (the semi-enclosed geometries) analyzed more recently than the previously published reports. The role of sensitivity studies is discussed, and some sample plots of sunspace performance sensitivity to key design parameters are presented. The monthly solar load ratio (SLR) correlations were reviewed with emphasis on the modified SLR used in the sunspace analysis. The application of the sunspace SLR correlations to monthly design analysis is outlined. DOE

N82-11602# Los Alamos Scientific Lab., N. Mex.

HEAT STORAGE DURATION

J. Douglas Balcomb 1981 6 p refs Presented at 6th Natl. Passive Conf., Portland, Oreg., 8 Sep. 1981

(Contract W-7405-eng-36)

(DE81-026635; LA-UR-81-2186; CONF-810925-4) Avail: NTIS HC A02/MF A01

Both the amount and duration of heat storage in massive elements of a passive building are investigated. Data taken or one full winter in a solar home are analzyed with the aid of subsystem simulation models. Heat storage duration is tallied into day intervals. Heat storage location is discussed and related to overall energy flows. DOE

N82-11603# Lincoln Lab., Mass. Inst. of Tech., Lexington.

PHOTOVOLTAIC OPERATIONS MANUAL RADIO STATION WBNO

D. N. Klein Mar. 1981 124 p refs

(Contract DE-AC02-76ET-20279)

(DE81-027439; DOE/ET-20279/110) Avail: NTIS HC A06/MF A01

The photovoltaic system operator is provided with the information needed to return to normal operation if the system has shut down and to maintain it in good operating condition. Appropriate safety information is provided for personal and equipment safeguarding. The site and equipment are briefly described. DOE

N82-11604# Sandia Labs., Albuquerque, N. Mex.

NON-SOLAR POWER TESTS AT THE CENTRAL RECEIVER TEST FACILITY (CRTF)

J. T. Holmes 1981 22 p refs Presented at Solar Thermal Test Facilities Users Assoc. Ann. Business and Tech. Meeting, Pasadena, Calif., 20 Apr. 1981

(DE81-026955; SAND-81-1546C) Avail: NTIS HC A02/MF A01

In addition to programs to develop central receiver technology components, r of other tests are summarized that use some of the unique capabilities of the CRTF. The three major noncentral receiver component tests have been a Navy/Applied Physics Laboratory simulation of aerodynamics heating of a missile nose-cone, a Sandia-Rockwell International gallium arsenide photovoltaic array, and a DNA/Science Applications development of a secondary beam concentrator. DOE

N82-11605# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

GROWTH OF SILICON SHEETS FROM METALLURGICAL-GRADE SILICON

T. F. Ciszek, M. Schietzelt, L. L. Kazmerski, J. L. Hurd, and B. Fernelius May 1981 9 p refs Presented at 15th IEEE Photovoltaic Specialists Conf., Orlando, Fla., 12-15 May 1981

(Contract DE-AC02-77CH-00178)

(DE81-025703; SERI/TP-611-1231; CONF-810526-32) Avail: NTIS HC A02/MF A01

Impure silicon is difficult to solidify in sheet form because of morphological proturberances which may result from consti-

tutional supercooling. Sheet growth methods which require a spcific crystallographic orientation or which are characterized by a narrow melt meniscus are most affected by this problem. The edge-supported pulling technique was applied to sheet growth of metallurgical grade silicon and DAR (Direct Arc Reactor) silicon. The 7 mm meniscus height associated with this technique allowed the growth of 5 cm wide sheets from both materials. In each case, the sheets were p-type. DOE

N82-11606# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

USE OF SOLAR THERMAL ENERGY TO GENERATE ELECTRICITY

L. M. Murphy Jul. 1981 22 p refs Presented at Energy in the Man-built Environ.: The Next Decade Specialty Conf., Vail, Colo., 3-5 Aug. 1981; sponsored by ASME

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE81-028797; SERI/TP-632-1287; CONF-810808-9) Avail: NTIS HC A02/MF A01

Solar thermal electric technology is reviewed. Technical approaches which result in net solar to electric conversion efficiencies ranging from less than 1 percent to more than 20 percent are discussed. The status of the various solar thermal electric concepts and the principal areas of research for each respective concept are reslted. Cost issues and prospects for the economic competitiveness of solar thermal electric systems with conventional systems are outlined. DOE

N82-11607# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

BIOLOGICALLY ASSISTED PHOTOELECTROCHEMICAL CELL

M. Seibert and Michael Kendall-Tobias Apr. 1981 5 p refs Presented at 15th AS/ISES Meeting, 26-30 May 1981

(DE81-025905; SERI/TP-623-1164) Avail: NTIS HC A02/MF A01

Chromatophore vesicles isolated from the photosynthetic bacterium Rhodospeudomonas sphaeroides were absorbed as a film on SnO2 Electrodes and examined in a photoelectrochemical cell. The photovoltage and photocurrents generated by the cell under steady-state red light irradiation were dependent on the state of the chromatophores as modified by the chemical properties of the cell electrolyte including pH, salt concentration, redox couple, and redox potential. The cell was operable in the redox range where to c2 cytochrome was reduced and the quinone pool was oxidized. Both these components are carries, in the cyclic electron transport system of bacterial photosynthesis and must control electron transport between the chromatophore membrane and the electrodes. DOE

N82-11608# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

THIN-FILM POLYCRYSTALINE SILICON SOLAR CELLS: PROGRESS AND PROBLEMS

T. Surek, A. P. Ariotedjo, G. C. Cheek, R. W. Hardy, J. B. Milstein, and Y. S. Tsuo May 1981 11 p refs Presented at 15th Photovoltaic Specialists Conf., 12-15 May 1981, Orlando, Fla.

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE81-025704; SERI/TP-614-1235; CONF-810526-37) Avail: NTIS HC A02/MF A01

The progress in cell research in the basic understanding of the effects of grain boundaries and the passivation of these effects was reviewed. Current concerns in this area include the scalability of the more promising approaches, the reliability and stability of the cells and modules, and an assessment of the low-cost potential of the technologies. T.M.

N82-11609# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

NATIONAL PHOTOVOLTAIC PROGRAM IN AMORPHOUS MATERIALS

Jack Stone, Ed Sabisky, Harry Mahan, Tom McMahon, and Frank Jeffrey May 1981 6 p refs Presented at the 15th Photovoltaic Specialists Conf., Orlando, Fla. 12-15 May 1981

(Contracts DE-AC02-77CH-00178; EG-77-CH-01-4042)

(DE81-025906; SERI/TP-614-1216) Avail: NTIS HC A02/MF A01

The development of high efficiency (10% goal), cost effective (15-40 cents per peak watt goal), thin film solar cells is investigated. The status of this program, other research activities, and expected near term performance improvements are summarized. DOE

N82-11610# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ANALYSIS OF INDIUM-PHOSPHIDE/INDIUM TIN OXIDE SOLAR CELLS

T. J. Coutts (Newcastle upon Tyne Polytechnic, England), N. M. Pearsall (Newcastle upon Tyne Polytechnic, England), R. Nottenburg, P. J. Ireland, and L. L. Kazmerski May 1981 7 p refs Presented at 15th Photovoltaic Specialists Conf., Orlando, Fla., 12-15 May 1981

(Contracts DE-AC02-77CH-00178)

(DE81-025907; SERI/TP-613-1225; CONF-810526-36) Avail: NTIS HC A02/MF A01

The mechanisms that underlie the operation of p-InP/N-ITO solar cells fabricated by depositing thin films of ITO onto InP substrates by both RF sputtering and ion-beam sputtering were investigated. The RF sputtered devices behave like SIS or heterojunction cells. The ion-beam sputtered cells behave more like buried homojunction devices. It is sown that the properties of these cells depend not only on the method of fabrication, but also on several other complicating effects which occur before, during and after deposition of the ITO. DOE

N82-11611# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

OCEAN ENERGY-WAVES, CURRENTS, AND TIDES

J. Miles and B. Shelpuk May 1981 11 p refs Presented at Energy in the Man-Built Environ. Urban Planning and Develop. Div. Spec. Conf., Vail, Colo., 3-5 Aug. 1981

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE81-025708; SERI/TP-634-1195; CONF-81080808) Avail: NTIS HC A02/MF A01

An overview is presented on the mechanical forms of ocean energy; i.e., waves, currents, and tides. Following an introductory section on wave mechanics, each of the three forms of ocean energy is considered under the headings of the resource, device types for energy extraction, and prognosis for practical implementation. DOE

N82-11612# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ANALYSIS OF SOLAR DESICCANT SYSTEMS AND CONCEPTS

R. Barlow May 1981 5 p refs Presented at the Active Contractor's Rev. Meeting, Washington, D.C., Sep. 1981

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE81-023027; SERI/TP-631-1254; CONF-810912-6) Avail: NTIS HC A02/MF A01

The modeling of desiccant systems is described. Computer programs for predicting the performance of silica gel beds in single-blow situations and in cyclically operating desiccant cooling systems (DESSIM) are presented. The single-blow model has been validated and shows excellent agreement with experimental data. Experimental data published by Koh are shown along with the corresponding prediction using DESSIM. DOE

N82-11613# Department of Energy, Washington, D. C. Office of Policy, Planning and Analysis.

INTERRELATIONSHIPS OF ENERGY AND THE ECONOMY: A SUPPLEMENT TO THE NATIONAL ENERGY POLICY PLAN REQUIRED BY TITLE VIII OF THE US DEPARTMENT OF ENERGY ORGANIZATION ACT (PUBLIC LAW 95-91)

Jul. 1981 70 p refs

(DE81-027526; DOE/PE-0030) Avail: NTIS HC A04/MF A01

This study developed a fairly wide range of estimates for the impact of energy prices on such key variables as real gross national product, inflation, and the US trade balance. The retrospective analysis suggests that potential economic output in the near future is being affected adversely by such energy price results from the recent past as lower investment, reduced labor force participation, slower growth in labor productivity, and reduced access to real energy resources. Policies that seek to stimulate the supply side of the economy (including policies that

seek to stimulate the specific development of energy resources) are directed at offsetting such past effects. 1981-90 projections are presented of the impacts upon the economy in the three energy price scenarios developed in the document Energy Projections to the Year 2000. DOE

N82-11614# Wisconsin Center for Public Policy, Madison.
SOLPLAN REPORT: AN ASSESSMENT OF BARRIERS AND INCENTIVES TO CONSERVATION AND ALTERNATIVE-ENERGY USE IN THE RESIDENTIAL SECTOR IN WISCONSIN
C. K. Fulenwider, Lonnie S. Weiss, Carol Pfefferkorn, Don E. Wiener, and Stephen L. Feldmam Mar. 1981 453 p
(Contract DE-FG02-79CS-30292)
(DOE/CS-30292/3) Avail: NTIS HC A20/MF A01

The Alternative Energy Policy Project of the Wisconsin Center for Public Policy focused upon two principle objectives: gathering the heating industry generally, the alternative-energy industry commercialization; and building consensus around alternative energy policy to develop guidelines for alternative energy policy for the state. Particular attention was paid to public involvement in the policy process and to assessing barriers and incentives from as many key sectors of the energy field as possible. Data were gathered from the general public, alternative energy users, the heating industry generally, the alternative-energy industry specifically, and key decision makers. T.M.

N82-11615# Old North Mfg. Co., Inc., Lenoir, N.C.
SOL-CYCLE: A SOLAR-ASSISTED SOLVENT-RECYCLING PROCESS FOR ASPHALT-IMPREGNATION OF FIBER BOARD
Ben E. Edwards 1 Apr. 1981 12 p
(DE81-903377; NCEI-0031) Avail: NTIS HC A02/MF A01

To conserve resources and energy in the production of Flex-Joint, an asphalt-impregnated fiber board, a manufacturing process was developed. The Sol-Cycle process provides for: (1) recycle of the solvent used in the saturation step; (2) conversion of raw to finished board in 24 hours; (3) better control of the saturation step; and (4) the use of solar energy for a part of the driving force to accomplish (1) and (2). DOE

N82-11616# South Carolina Energy Research Inst., Columbia.
RESIDUAL-ENERGY-APPLICATIONS PROGRAM: EAST-FACILITY REQUIREMENTS DOCUMENT
P. W. Yngve and F. H. Zander 31 Jul. 1981 237 p refs
(Contract DE-AC09-77ET-12866)
(DE81-027489; DOE/ET-12866/8-Vol-2) Avail: NTIS HC A11/MF A01

The objectives of the EAST facility are to perform research and development on heat energy recovery and conversion equipment; establish high confidence in system performance, system availability, and system operating, maintenance, and material costs; and provide a national competence in technologies required for the installation and operation of heat recovery systems. Detailed descriptions of seven potential test articles which represent a wide range of types and sizes of heat recovery systems were contained. EAST operations, including test planning, test policies, systems testing, and facility organization and staffing were discussed. Additionally, information is included on a preliminary site analysis for the EAST Facility and other test support system requirements are described. T.M.

N82-11617# Sandia Labs., Albuquerque, N. Mex.
PERFORMANCE TESTING OF THE TOLTEC TI-410 CONCENTRATING SOLAR COLLECTOR
V. E. Dudley (Edgerton, Germeshausen and Grier, Inc.) and R. M. Workhoven Jul. 1981 55 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029994; SAND-81-0369) Avail: NTIS HC A04/MF A01

Results of tests conducted on the collector are summarized. Collector efficiency, thermal loss, and receiver differential pressure were measured at fluid temperatures from 20 C to 200 C. The collector was evaluated with a glass mirror and with an acrylic/polyester film reflector surface. Four different receiver designs were tested. DOE

N82-11618# Nevada Univ., Boulder City. Desert Research Inst.
ANALYSIS OF SATURATED SOLAR POND CHARACTERISTICS, VOLUME 1 Final Report, 1 Oct. 1979 - 30 Apr. 1981
T. Ochs, C. G. Stojanoff, Don L. Day, Eric Eckert, Jim Langeliers, and David Wruck May 1981 98 p refs
(Contract DE-AS04-79CS-30174)
(DE81-030820; DOE/CS-30174/T2-Vol-1) Avail: NTIS HC A05/MF A01

The actual phenomena taking place in a saturated solar pond are studied. Experimental procedures for solar ponds are presented. In an attempt to summarize the physical properties of salt solutions an exhaustive literature search was conducted. The basic definitions of terms and a summary of the properties of pure water are included. Data are tabulated on a number of binary aqueous solutions (one salt and water). DOE

N82-11619# Oak Ridge National Lab., Tenn. Engineering Technology Div.
OCEAN THERMAL ENERGY CONVERSION GAS-DESORPTION STUDIES. VOLUME 2: DEAERATION IN A PACKED COLUMN AND A BAROMETRIC INTAKE SYSTEM
A. Golshani and F. C. Chen Sep. 1981 64 p refs
(Contract W-7405-eng-26)
(DE81-030469; ORNL/TM-7438-Vol-2) Avail: NTIS HC A04/MF A01

After a review of previous relevant studies, the design of a gas desorption test loop and a barometric intake system are described. The results of vacuum deaeration in a packed column and a barometric intake system are presented, and the savings that can be achieved when the packed column and barometric intake system are combined are discussed. Vacuum deaeration laboratory experiments using three different kinds of packings in a packed column test section and a series of barometric intake deaeration experiments are reported. A conceptual OTEC deaeration subsystem design, based on these results, and its implications on an OTEC-open cycle power system are presented. DOE

N82-11620# Potomac Electric Power Co., Washington, D.C.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 8: DESIGN APPROACHES: UPH Final Report
Jun. 1981 297 p Prepared in cooperation with Acres American, Inc., Buffalo, N.Y. Sponsored in part by Electric Power Research Inst.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-030673; EPRI-EM-1589-Vol-8) Avail: NTIS HC A11/MF A01

The development of the design approaches used to determine the plant and overall layout for a underground pumped hydroelectric (UPH) storage facility having a maximum generating capacity of 2000 MW and a storage capacity of 20,000 MWh is discussed. Key factors were the selection of the high head pump-turbine equipment and the geotechnical considerations relevant to the underground cavern designs. The comparison of pump-turbine alternatives is described leading to the selection for detailed study of both a single-step configurations, using multistage reversible pump-turbines, and a two-step configuration, with single-stage reversible pump-turbines. DOE

N82-11621# Potomac Electric Power Co., Washington, D.C.
PRELIMINARY DESIGN STUDY OF UNDERGROUND PUMPED HYDRO AND COMPRESSED-AIR ENERGY STORAGE IN HARD ROCK. VOLUME 9: DESIGN APPROACHES: CAES, APPENDIX C. MAJOR MECHANICAL EQUIPMENT Final Report
Apr. 1981 108 p refs Prepared in cooperation with Acres American, Inc., Columbia, Md. Sponsored in part by Electric Power Research Inst.
(Contract DE-AC02-77ET-28013; EPRI Proj. 1081-1)
(DE81-030672; EPRI-EM-1589-Vol-9-App-C) Avail: NTIS HC A06/MF A01

The major mechanical equipment includes the turbine-motor/generator, compressor train, intercooler/aftercooler system, and

exhaust gas recuperator. The design criteria for each of these components is interrelated with, and dependent upon, each of the other components within the major mechanical equipment group. Careful consideration of this dependency has resulted in an overall design approach which satisfies the requirements of the CAES operational cycle while providing for a conservative component design. DOE

N82-11622# Lincoln Lab., Mass. Inst. of Tech., Lexington.
CARLISLE HOUSE: AN ALL-SOLAR ELECTRIC RESIDENCE
Burt E. Nichols and Steven J. Strong (Solar Design Associates, Lincoln, Mass.) 1981 4 p Presented at the 15th IEEE Photovoltaic Specialist Conf., Orlando, Fla., 11-15 May 1981 Sponsored by DOE
(DOE/ET-20279/133; CONF-810526-16) Avail: NTIS HC A02/MF A01

A solar photovoltaic array on the roof produces electricity, passive solar features provide much of the space heating, thermal collectors provide domestic hot water, and energy conservation measures reduce electrical and thermal energy requirements to a minimum. The overall performance of the system was reviewed. T.M.

N82-11623# Georgia Inst. of Tech., Atlanta. School of Social Sciences.
AN ASSESSMENT OF SELECTED SOLAR ENERGY INDUSTRY ACTIVITIES
J. David Roessner Nov. 1980 129 p refs
(PB81-222424; NSF/PRA-80-SP-1187) Avail: NTIS HC A07/MF A01 CSCL 05C

The past, present, and near-term conditions of four industries based on solar energy technologies are examined-solar heating; photovoltaics; concentrating solar collectors for process heat and electric power applications; and passive components such as skylights and greenhouses. The report identifies key, unresolved issues for government policies intended to influence future solar industrial development; assesses the past and current federal role in these industries; and draws tentative conclusions about how government policies have affected their evolution. This evolution is compared to the evolution of typical, innovation-based industries. For each of the four solar industries researched, the collected data are discussed as follows: characteristics of sales; the government role; investment strategies and R & D activities; near-term trends; and comparisons with other industries. GRA

N82-11624# State Univ. of New York at Albany.
SITE SELECTION FOR SMALL WIND ENERGY CONVERSION SYSTEMS FOR US DEPARTMENT OF ENERGY FIELD EVALUATION PROGRAM
Bruce H. Bailey Oct. 1980 67 p Sponsored by New York State Energy Research and Development Authority
(PB81-226862; NYSERDA-81-2) Avail: NTIS HC A04/MF A01 CSCL 10A

The site selection procedure followed to locate two qualified sites for the installed and monitoring of two commercially available small wind energy conversion systems as part of the U.S. Department of Energy's Field Evaluation Program is described. The aim of the evaluation program is to gain operating experience with wind systems in actual locations and to identify the siting and operational issues involving wind energy conversion systems. The two sites selected were approved as test sites for the program. GRA

N82-11625# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering, Aeronautical Engineering and Mechanics.
THE ROGERS FOCUSING HELIOSTAT EXPERIMENTAL PROGRAM AT RENSSELAER POLYTECHNIC INSTITUTE
W. E. Rogers, D. N. Borton, and M. P. Rice Dec. 1980 39 p Sponsored by New York State Energy Research and Development Authority
(PB81-226813; Rept-80-24; NYSERDA-80-24) Avail: NTIS HC A03/MF A01 CSCL 10A

A research effort to develop a solar collector package designed specifically with the needs and solar resources of the Northeast in mind is described. The heliostat is a concentrating solar collector which is 30 feet high, 34 feet wide and has 864 square feet of mirror concentrator. Electric controls move the structure so it tracks the path of the Sun as it rises and sets and moves across the sky. When the Sun is not shinning, the mirrors turn down, shielding them from the dirt, ice and snow. However, when it rains the mirrors turn up for cleaning, helping to keep them in peak operating condition. The heliostat's design incorporates a concentrating capability which takes the diffuse energy of the Sun and focuses it, creating temperatures of more than 3,600 F and producing enough steam as a result to displace 70 kW of electricity at peak operation. The unit tested in this demonstration was used for space heating, and domestic hot water as well as to fire an absorption air conditioner. GRA

N82-11626# Mitre Corp., McLean, Va. Energy and Resources Div.
US ENERGY STRATEGIES: SOME OPTIONS FOR ELIMINATING OIL IMPORTS BY THE YEAR 2000
Edward G. Sharp, Elaine G. Carlson, Daniel J. Entingh, John J. Fearnsides, Robert P. Foreman, Willard E. Fraize, David Gray, Rodney K. Lay, John G. Leigh, Milton Lytton et al Apr. 1981 23 p refs
(PB81-226052; MTP-81W0002) Avail: NTIS HC A02/MF A01 CSCL 10A

Topic areas discussed include: reasonable choices which eliminate the need for oil imports; potential domestic liquid fuel supplies; capital requirements for increased domestic liquid fuel supplies; potential for reducing liquid fuels demand; and domestic natural gas. Other domestic energy resources and future domestic energy demands are discussed. GRA

N82-11627# National Highway Traffic Safety Administration, Washington, D. C. Technology Assessment Div.
THIRD AUTOMOTIVE FUEL ECONOMY RESEARCH CONTRACTORS COORDINATION MEETING
Charles L. Gauthier, ed. Dec. 1980 777 p refs Proceedings of Conf. held in Washington, D.C., 1-2 Dec. 1980
(PB81-222754) Avail: NTIS HC A99/MF A01 CSCL 10A

Topic areas covered include: industry analyses; driver energy conservation; heavy duty trucks; consumer research and market demand; vehicle weight reduction; and diesel engine studies are presented. Spark ignition engine and drivetrain improvements. GRA

N82-11628# Bureau of Mines, Spokane, Wash. Research Center.
PREVENTING LARGE-BATTERY EXPLOSIONS
D. Cummins and S. F. Pangeri Aug. 1980 17 p refs
(PB81-227373; BM-IC-8842) Avail: NTIS HC A02/MF A01 CSCL 08I

This information circular presents a brief history of the lead-acid battery and describes ways to prevent serious injury from battery explosions when servicing and charging lead-acid batteries, particularly in the surface mining industry. The Mining Safety and Health Administration (MSHA), U.S. Consumer Product Safety Commission, battery maufacturers, and the mining industry have all contributed information as well as recommendations for injury-free handling for this report. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-11629 California Inst. of Tech., Pasadena.
MATHEMATICAL MODELING OF PHOTOCHEMICAL AIR POLLUTION Ph.D. Thesis
Gregory John McRae 1981 796 p
Avail: Univ. Microfilms Order No. 8121063

Air pollution is an environmental problem that is both pervasive and difficult to control. An important element of any rational control approach is a reliable means for evaluating the air quality impact of alternative abatement measures. Such a capability is presented in the form of a mathematical description of the production and transport of photochemical oxidants within an urban airshed. The combined influences of advection, turbulent

diffusion, chemical reaction, emissions and surface removal processes are all incorporated into a series of models that are based on the species continuity equations. A delineation of the essential assumptions underlying the formulation of a three-dimensional, a Lagrangian trajectory, a vertically integrated and single cell air quality model is presented. Since Each model employs common components and input data the simpler forms can be used for rapid screening calculations and the move complex ones for detailed evaluations. Dissert. Abstr.

N82-11630 California Univ., Los Angeles.
BEACH FORESHORE SEDIMENTATION BY ORGANIC AND INORGANIC PROCESSES Ph.D. Thesis
Robert Walter Anderhalt 1981 208 p refs
Avail: Univ. Microfilms Order No. 8129016

Inorganic processes of sedimentation are studied using the small-scale sedimentary sequence. Small-scale sedimentary sequences are the trends observed in the sediment characteristics from closely-spaced, mm-scale, stratigraphic intervals. Swash-zone deposition processes may be inferred from the type of sequence observed. Some of the trends correspond to recognizable layers or laminae in the sediment but in places these sequences are not visually obvious. The type of bedding which can be discerned only in small-scale sedimentary sequences or other special treatments (peels, X-radiographs), is referred to of latent bedding. Organic processes of sedimentation were studied using sediment samples collected from various positions within the sandy beach environment. These samples were analyed for total organic carbon (TOC), percent carbonate, percent water, percent gravel, percent sand, percent mud, and grain size for the purpose of determining the controls on TOC in this environment. Dissert. Abstr.

N82-11631 Princeton Univ., N. J.
GEOCHEMICAL CONTROLS ON TRACE METAL TRANSPORT IN AQUEOUS ENVIRONMENTAL SYSTEMS Ph.D. Thesis
Jeffrey Lynn Means 1981 260 p
Avail: Univ. Microfilms Order No. 8121473

Geochemical controls on the mobility of selected trace metals in two different environmental systems are examined. Geochemical processes that are promoting or retarding the leakage of radionuclides from waste disposal pits and trenches and natural controls on trace metal geochemistry in ground, surface, and estuary water are evaluated. Initially, organic controls on trace element transport and the removal mechanisms of trace elements were the principal subjects of interest. Later, inorganic controls on iron and aluminum solubility, bacterial mechanisms of bog iron deposition, and the trace element and organic geochemistry of the estuaries were also investigated. The results of the bog iron deposition study suggest that iron oxidizing bacteria are catalyzing the precipitation of bog iron. Results of both the study areas lead to the generalization that some of the important geochemical controls on trace element transport in aqueous environmental systems are very selective reactions between only trace amounts of reactants. Dissert. Abstr.

N82-11632 Rutgers - The State Univ., New Brunswick, N. J.
NITROGEN DYNAMICS IN A LAGOON DEVELOPMENT AND AN ADJACENT SALT MARSH Ph.D. Thesis
Teruo Sugihara 1981 367 p
Avail: Univ. Microfilms Order No. 8122131

Aquatic nitrogen standing stocks, factors affecting these stocks, and various nitrogen cycle processes were studied at a lagoon housing development and an adjacent salt marsh near Manahawkin, New Jersey. Inorganic (ammonia, nitrate, and nitrite) and total organic nitrogen were measured at a number of stations in both the altered and natural marsh systems. Other factors measured concurrently were water temperature, salinity, dissolved oxygen, and depth among others. During the latter portion of the study, nitrogen fixation activities fo several commmunities in both types of systems were determined using the acetylene reduction methods. The nitrogen inputs due to ammonification, excretion, and precipitation/runoff were also monitored in part at this time. Dissert. Abstr.

N82-11633 California Univ., Los Angeles.
ENVIRONMENTAL PROTECTION AS AN ONGOING COMPONENT OF LARGE FACILITIES ENGINEERING PROJECTS Ph.D. Thesis
Paul Edward Smokler 1981 242 p
Avail: Univ. Microfilms Order No. 8122847

An Environmental Protection System (EPS) was developed. The purpose of the system is to ensure that environmental protection begins at the project conceptual stage, and continues through design, construction, and implementation of construction surveillance. This system, initiated in rudimentary form for the Space Shuttle (West Coast) Space Transportation System was expanded upon and refined in the application of EPS to the Missile X (MX) project. The stages of a large facilities engineering project include systems requirements definition, system design, definition of facility requirements, development of facility criteria, generation of facility designs, facility construction, and facility activation and operation. The EPS is composed to environmental parameters such as endangered species, archaeology, etc. However, the key to its implementation is in the endeavors to translate this scientific intent into the tangible engineering criteria. Dissert. Abstr.

N82-11634* National Aeronautics and Space Administration. Pasadena Office, Calif.
SEWAGE SLUDGE ADDITIVE Patent
John J. Kalvinskas (JPL, California Inst. of Tech., Pasadena), William A. Mueller (JPL, California Inst. of Tech., Pasadena), and John D. Ingham, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 24 Jun. 1980 5 p Filed 28 Jan. 1976 Sponsored by NASA
(NASA-Case-NPO-13877-1; US-Patent-4,209,393; US-Patent-Appl-SN-652979; US-Patent-Class-210-40; US-Patent-Class-252-422) Avail: US Patent and Trademark Office CSCL 13B

The additive is for a raw sewage treatment process of the type where settling tanks are used for the purpose of permitting the suspended matter in the raw sewage to be settled as well as to permit adsorption of the dissolved contaminants in the water of the sewage. The sludge, which settles down to the bottom of the settling tank is extracted, pyrolyzed and activated to form activated carbon and ash which is mixed with the sewage prior to its introduction into the settling tank. The sludge does not provide all of the activated carbon and ash required for adequate treatment of the raw sewage. It is necessary to add carbon to the process and instead of expensive commercial carbon, coal is used to provide the carbon supplement. T.M.

N82-11635*# Mitre Corp., McLean, Va. Metrek Div.
SHUTTLE APPLICATIONS IN TROPOSPHERIC AIR QUALITY OBSERVATIONS Final Report
E. Friedman, J. Gupta, and J. Carmichael Aug. 1978 122 p refs Sponsored by NASA
(Contract F19628-78-C-001)
(NASA-CR-145374) Avail: NTIS HC A06/MF A01 CSCL 13B

The role which might be played by the space shuttle in obtaining data which describes the air quality of the north-eastern United States was investigated. The data requirements of users, a model for statistical interpretation of the observations, the influence of orbit parameters on the spatial and temporal sampling and an example of application of the the model were considered. R.J.F.

N82-11636*# National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: TESTING AND UTILIZATION OF A NEW METHODOLOGY
Jacques Francois Sep. 1981 34 p Transl. into ENGLISH of "Repercussion du Bruit des Avions sur l'Equilibre des Riverains des Aeroports: Test et Mise au Point d'une Methodologie Nouvelle" Paris, Aug. 1977 p 1-134 Transl. was announced as N81-27692 Transl. Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by IFOP/ETMAR
(Contract NASw-3542)
(NASA-TM-76628) Avail: NTIS HC A03/MF A01 CSCL 13B

The focus of the investigation is centered around two main themes: an analysis of the effects of aircraft noise on the psychological and physiological equilibrium of airport residents;

and an analysis of the sources of variability of sensitivity to noise. The methodology used is presented. Nine statistical tables are included, along with a set of conclusions. T.M.

N82-11637# Scripps Institution of Oceanography, La Jolla, Calif. Visability Lab.

MEASUREMENTS OF AEROSOL SIZE DISTRIBUTION IN THE LOWER TROPOSPHERE OVER NORTHERN EUROPE Interim Report

Bruce W. Fitch and Ted S. Cress Jun. 1981 15 p refs
(Contract F19628-78-C-0200; AF Proj. 7670)
(AD-A104272; SIO-REF-81-18; SCIENTIFIC-14; AFGL-TR-80-0192) Avail: NTIS HC A02/MF A01 CSCL 04/1

Airborne measurements of particle size distributions were made at several altitudes within and above the mixing layer at sites near Ahlhorn and Meppen (W. Germany), Rodby (Denmark) and Bruz (France). The distributions were measured over the range 0.2 to 5.9 micrometers in particle radius using a Royco model 220 particle counter. The experimental data gathered at the sites were analyzed in terms of volume-size distributions instead of the commonly used particle number distributions. The volume distribution plots were found to be bimodal with the accumulation mode centered at a mean particle radius in the range 0.26 to 0.49 microns and the coarse particle mode existing beyond 1.0 micron. The data show the accumulation mode is well defined by a log-normal distribution. The values of the measured volume scattering coefficient and mean particle radius of the accumulation mode increase as the maximum particle volume of the mode increases. The existence of an accumulation mode was almost always confined to the mixing layer. It is interesting that haze layers above the mixing layer were found to have a distinct coarse particle mode but, generally, no distinct accumulation mode. The total concentration of particles in each of the two modes appear related for larger values of concentration in the coarse particle mode. Author (GRA)

N82-11638# Bedford Research Associates, Mass.

CHEBYSHEV POLYNOMIAL APPROXIMATION IN THE OPAQUE PROGRAM

P. Tsipouras and T. Costello 30 Jan. 1981 14 p
(AD-A104317; SCIENTIFIC-4; AFGL-TR-81-0056) Avail: NTIS HC A02/MF A01 CSCL 04/1

The use of expansions in Chebyshev polynomials is investigated for determining the size distribution function of aerosol particles. Three different models of size distribution in aerosols, Junge's, a unimodel lognormal model, and the haze L model are considered in this context, and the advantages of the techniques are indicated. Author (GRA)

N82-11639# Atmospheric Radiation Consultants, Action, Mass.

PROOF OF CONCEPT STUDY

A. S. Zachor, F. P. DelGreco, and M. Ahmadjian (AFGL) Hanscom AFB, Mass. AFGL 23 Mar. 1981 42 p refs Prepared for Utah State Univ., Logan
(Contract F19628-77-C-0203; AF Proj. 2310)
(AD-A104338; AFGL-TR-81-0134; SR-6) Avail: NTIS HC A03/MF A01 CSCL 17/5

Field test data were analyzed and computer simulations performed to validate the predictions of an earlier study, which calculated the minimum detectable quantities (MDQ's) of trace gases that can be detected remotely using high-resolution spectroscopy. The study demonstrates convincingly that reliable detection can be achieved near the MDQ level in a benign real-world environment. Author (GRA)

N82-11640# Oak Ridge National Lab., Tenn.

METEOROLOGICAL EFFECTS OF THERMAL ENERGY RELEASES (METER) PROGRAM Annual Progress Report, Oct. 1979 - Sep. 1980

H. W. Hoffman and A. A. N. Patrinos Sep. 1981 87 p refs
(DE81-030431; ORNL/TM-7744) Avail: NTIS HC A05/MF A01

The program was initiated to determine the potential for weather modification arising from the heat and moisture introduced to the atmosphere by the evaporative cooling towers at electric generating plants. The principal program focus was precipitation modification with concentration on the acquisition of rainfall data at the coal fueled Bowen Electric Generating Plant in northwestern Georgia. DOE

N82-11641# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.

KINETICS OF NO/ SUB X FORMATION DURING EARLY STAGES OF PULVERIZED-COAL COMBUSTION Quarterly Report, 4 Apr. - 30 Jun. 1981

W. V. Krill, E. K. Chu, G. C. Snow, S. Pessagno, and H. Tong 31 Jul. 1981 54 p refs
(Contract DE-AC22-80PC-30295)
(DE81-029071; DOE/PC-30295/3; QR-3) Avail: NTIS HC A04/MF A01

Kinetics of NO/sub x/ formation during early stages of pulverized coal combustion, are reported. The well stirred nature of the reactor gas phase region and coal transport air are verified in cold flow and combustion tests. A single pass trajectory of coal paticles through the stirred region was achieved. Preliminary thermal NO/sub x/ formation characteristics of the gas phase and the reactor temperature environment are measured for use with the kinetic model. DOE

N82-11642# Acurex Corp., Mountain View, Calif.

SURVEY OF PARTICULATE EMISSION MACRO- AND MICRO-SAMPLING AND SIZING METHODS

William O. Lipscomb Feb. 1981 116 p refs
(Contract DE-AC18-80FC-10193)
(DE81-028348; DOE/FC-10193/T1; Acurex-TR-81-01/SR) Avail: NTIS HC A06/MF A01

Methods for sampling and fractionating flue gas particulates were developed. The survey was composed of three parts: (1) macro methods; (2) micro methods; and (3) real time-monitoring/sizing methods. A survey and cursory evaluation of commercially available macro, micro, and real time measurement systems is presented. It is concluded that macro and micro methods utilizing impactors and cyclones are available. DOE

N82-11643# Oak Ridge National Lab., Tenn.

TRACE-ELEMENT AND PHASE RELATIONS IN FLY ASH Final Report

L. D. Hulett, A. J. Weinberger, N. M. Ferguson, K. J. Northcutt, and W. S. Lyon Electric Power Research Inst. May 1981 70 p refs Sponsored in part by Electric Power Research Inst.
(Contract W-7405-eng-26; EPRI Proj. 1061)
(DE81-028555; EPRI-EA-1822) Avail: NTIS HC A04/MF A01

Matrix components were isolated and individually analyzed to determine trace element distributions. After particle sizing and extraction of magnetic components, the aluminosilicate phases were etched in 1 percent HF to remove glasses comingled with mullite and quartz. Neutron activation and atomic absorption analyses showed tha most of the +1- and +2-valent elements, rare earths, and certain transition metals were concentrated in the glass phases. Cr, V, Ti, Fe, Ga, and Zr, which are trivalent and tetravalent, were concentrated in the crystal phases. X-ray diffraction and elemental analyses show that the main components of the magnetic phase are ferrite compounds with compositions of approximately Fe23AlO7O4. First-row transition elements, V, Cr, Mn, Co, Cu, Ni, and Zn are concentrated by factors as high as 50 in the magnetic phases. DOE

N82-11644# Argonne National Lab., Ill. Energy and Environmental Systems Div.

SOLID AND HAZARDOUS ENERGY WASTES: SYNFUELS. 1: REVIEW OF RESEARCH ACTIVITIES

L. Fradkin, T. Surles, and W. DeCarlo May 1981 164 p refs Sponsored in part by EPA
(Contract W-31-109-eng-38)
(DE81-028503; ANL/EES-TM-142) Avail: NTIS HC A08/MF A01

Chemical and biological research on solid, liquid, and gaseous waste streams from coal conversion and oil shale technologies is summarized. Brief descriptions, the objectives, current activities, and future plans, of ongoing projects were obtained. References to publications that resulted from the various research projects are included. References to work on hazardous and solid synfuel waste are included in the appendixes. DOE

N82-11645# California Univ., Berkeley. Earth Sciences Div.
OTEC ENVIRONMENTAL BIOLOGICAL OCEANOGRAPHIC PROGRAM
E. O. Hartwig Jul. 1981 14 p Presented at the US Dept. of Energy/Marine Technol. Soc. 8th Ocean Energy Conf., Washington, D.C., 7-11 Jun. 1981
(Contract W-7405-eng-48)
(DE81-027402; LBL-12963; CONF-810622-7) Avail: NTIS HC A02/MF A01

The effect of OTEC operations on the environment are discussed. The spatial and temporal patterns of the plankton community in terms of absolute number, biomass and species composition were investigated at potential OTEC sites. The changes with depth of all three measurements are documented. Diel fluctuations in number and species composition was studied at one site. Horizontal and seasonal patterns of variability exist at all sites. The overall trophic structure of the plankton community at these sites using these data, gut content analysis, and information already in the literature is determined. DOE

N82-11646# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
INTERGRATED ASSESSMENT FOR ENERGY-RELATED ENVIRONMENTAL STANDARDS: A SUMMARY OF ISSUES AND FINDINGS
John P. Holdren Oct. 1980 60 p refs
(Contract W-7405-eng-48)
(DE81-028552; LBL-12779) Avail: NTIS HC A04/MF A01

Environmental impacts of energy technologies arise from many stages in the flow of an energy source from discovery to end-use, propagate via disruptions in many media, and manifest themselves as many different undesirable effects. The aim of the investigation is to understand the capacities and limitations of the assessment mechanisms available for use in the formulation of environmental standards applied to energy technologies. T.M.

N82-11647# California Univ., Livermore. Lawrence Livermore Lab.
REPORT OF LAWRENCE LIVERMORE NATIONAL LABORATORY TO THE FEDERAL AVIATION AGENCY ON THE HIGH-ALTITUDE POLLUTION PROGRAM, 1980 Annual Report, 1980
F. M. Luther Dec. 1980 99 p refs
(Contract W-7405-eng-48)
(DE81-028264; UCRL-50042-80) Avail: NTIS HC A05/MF A01

The primary research emphases are numerical modeling of the atmospheric response to stratospheric perturbations and processing and analysis of satellite infrared radiance data to determine global distributions of stratospheric ozone. The modeling effort covers three major research areas: photochemical kinetics, coupled kinetics and transport, and radiative transfer. Tasks completed include: comparison of model simulations of potential changes resulting from aircraft engine emissions and other perturbations, ozone trend analyses, and assessments of coupled perturbations. T.M.

N82-11648# Maine Univ., Orono. Land and Resources Inst.
EFFECTS OF ACID PRECIPITATION ON CATION TRANSPORT IN NEW HAMPSHIRE FOREST SOILS
C. S. Cronan Jul. 1981 51 p refs Prepared for Dartmouth Coll.
(Contract DE-AS02-77EV-04498)
(DE81-027494; DOE/EV-04498/1) Avail: NTIS HC A04/MF A01

The effects of regional acid precipitation on forest soils and watershed biogeochemistry were studied. The following findings are described: (1) acid precipitation causes increased aluminum mobilization and leaching from soils to sensitive aquatic systems; (2) acid deposition shifts the historic carbonic acid/organic acid leaching regime in forest soils to one dominated by atmospheric H_2SO_4; (3) acid precipitation accelerates nutrient cation leaching from forest soils and posses a threat to the potassium resources of northeastern forested ecosystems; (4) while acid rain may pass through some coniferous canopies without being neutralized, similar inputs of acid rainfall to hardwood canopies are neutralized by Bronsted base leaching and by leaf surface ion exchange mechanisms; and (5) progressive acid dissolution of soils in the laboratory provides tool for predicting the patterns of aluminum leaching from soils exposed to acid deposition. DOE

N82-11649# Sandia Labs., Albuquerque, N. Mex.
ENVIRONMENTAL MONITORING REPORT, SANDIA NATIONAL LABS., ALBUQUERQUE, NEW MEXICO, 180
Gloria Chavez Millard, Theodore N. Simmons, Charles E. Gray, and Bill L. ONeal Apr. 1981 27 p refs
(Contract DE-AC04-76DP-00789)
(DE81-027839; SAND-81-0566) Avail: NTIS HC A03/MF A01

Radionuclides are potentially released from five technical areas from the laboratories research activities. The program searches for cesium-137, tritium, uranum, alpha emitters, and beta emitters in water, soil, air, and vegetation. No activity was found in public areas in excess of that found in local background in 1980. The Albuquerque population receives only 0.11 person-rem (estimated) from airborne radioactive releases. While national security research is the laboratories major responsibility, energy research is a major area of activity. Both these research areas cause radioactive releases. T.M.

N82-11650# Ames Lab., Iowa. Dept. of Chemistry.
LIQUID-LIQUID CHROMATOGRAPHY FRACTIONATION OF ORGANIC COMPOUNDS IN COMPLEX MIXTURES: APPLICATION TO AUTOMOBILE EXHAUST Ph.D. Thesis
Steven Gray Colgrove 1980 304 p refs
(Contract W-7405-eng-82)
(DE81-030743; IS-T-914) Avail: NTIS HC A12/MF A01

With the use of the fractionation method, a mixture of organic compounds can be separated into strong acid, weak acid, base, aldehyde, ketone, polar, and nonpolar fractions. Organic compounds, representing several chemical classes, were used to determine how much material would be lost during the fractionation and to determine how well the various compound types could be separated from each other. Most of the compounds tested were recovered in yields which were sufficient to provide good qualitative and quantitative data. Problems relating to impurities introduced into samples by solvents and reagents were examined. In addition, some reactions which led to the formation of artifacts were investigated. DOE

N82-11651# Lovelace Biomedical and Environmental Research Inst., Albuquerque, N. Mex. Inhalation Toxicology Research Inst.
LOW-BTU-GASIFIER EMISSIONS TOXICOLOGY Status Report, Dec. 1980
R. F. Henderson, ed. Apr. 1981 67 p refs
(Contract DE-AC04-76EV-01013)
(DE81-031000; LMF-85) Avail: NTIS HC A04/MF A01

Inhalation hazards to plant workers and the general population that may be associated with low Btu coal gasification were assessed. To achieve this goal, it is necessary to characterize the potential toxicants in liquid and solid process and waste streams. The experimental low Btu gasifier at METC was sampled to determine aerosol components in gaseous process streams and to assess potential toxicants in liquid and solid effluent streams. T.M.

N82-11652# Arizona Univ., Tucson. Dept. of Mining and Geological Engineering.
SULFUR POLLUTION CONTROL. PHASE 1: THE DISPOSAL PROGRAM Final Report, Sep. 1978 - Jun. 1980
Michael Rieber, Benjamin Okech, and Roger Fuller Jan. 1981 263 p refs
(Contract DI-BM-JO-88144)
(PB81-222612; BM-OFR-94(3)-81) Avail: NTIS HC A12/MF A01; also available in set of 4 reports HC E99 CSCL 07A

Sulfuric acid production from sulfur based acid plants and smelters is analyzed and industry competition, with particular emphasis on voluntary versus abatement acid, is reviewed. Production costs for both acid plants and smelters are estimated. Large scale users prefer sulfur based acid production if the heat value of the reaction is utilized as a steam credit. Voluntary acid is a more stable supply source than smelter acid. Voluntary acid output is a reaction to price and demand conditions. An

output forecast is made based on APC regulations, implementation, and estimated metals production. GRA

N82-11653# Arizona Univ., Tucson. Dept. of Mining and Geological Engineering.
SULFUR POLLUTION CONTROL. PHASE 2: THE IMPACT OF STACK GAS CLEANUP ON THE SULFUR MINING INDUSTRY OF TEXAS AND LOUISIANA Final Report, Sep. 1978 - Nov. 1980
Michael Rieber, James M. Barker, and Michael Worrall Jan. 1981 116 p refs
(Contract D1-BM-JO-188144)
(PB81-222820; BM-OFR-94(4)-81) Avail: NTIS HC A06/MF A01 CSCL 07A

The analytic time basis is 1979. Industry labor and output characteristics were developed on a company and mines basis. State and local impacts (to the level of independent school districts) were developed on a scenario basis. The measures include income, unemployment, and taxes. Some data are presented on energy and water use. GRA

N82-11654# Exxon Research and Engineering Co., Florham Park, N.J.
CONTROL OF UTILITY BOILER AND GAS TURBINE POLLUTANT EMISSIONS BY COMBUSTION MODIFICATION, PHASE 2 Final Report, Jun. 1976 - Jun. 1979
E. H. Manny and A. R. Crawford Mar. 1981 178 p refs
(Contract EPA-68-02-1415)
(PB81-222267; EPA-600/7-81-039; EE.5E.81) Avail: NTIS HC A09/MF A01 CSCL 13B

The applicability of combustion modification (CM) techniques to control NOx and other pollutant emissions from utility boilers and gas turbines without causing deleterious side effects was studied. Comprehensive, statistically designed tests were used to evaluate the effect of CM. In staged low excess air tests of low-NOx, dual-fired utility boilers, special attention was paid to the determination of potentially adverse side effects; increased combustible emissions, unwanted changes in particulate mass loading and size distribution, reduced boiler efficiency, increased furnace slagging, and tube wall corrosion may be applied to coal fired utility boilers. The extent of furnace tube wall corrosion and slagging could not be determined conclusive. GRA

N82-11655# Arizona Univ., Tucson. Dept. of Mining and Geological Engineering.
SULFUR POLLUTION CONTROL PHASE 1: THE DISPOSAL PROGRAM (SECTIONS 5 THROUGH 7) Final Report
Michael Rieber, Roger Fuller, and Osmario Dellaretti Jan. 1981 190 p refs
(Contract DI-BM-JO-188144)
(PB81-222804; BM-OFR-94(2)-81) Avail: NTIS HC A09/MF A01 CSCL 13B

Sulfur recovery from domestic sour natural gas and petroleum refining on a current basis and projected to the mid-1990's on a regional basis was estimated. The current basis depends importantly on gas production projection for the Overthrust Belt and the associated H2S. The regional basis depends on projected increases in the sulfur content and weight of imported crude oils, total crude oil imports, and anticipated refinery response. GRA

N82-11656# Research Triangle Inst., Research Triangle Park, N. C.
ASSESSMENT OF HAZARD POTENTIAL FROM COMBUSTION OF WASTES IN INDUSTRIAL BOILERS Final Report, Jun. 1980 - Apr. 1981
J. W. Harrison, J. B. White, and W. J. King Jul. 1981 122 p refs
(Contract EPA-68-02-3170)
(PB81-221889; EPA-600/7-81-108) Avail: NTIS HC A06/MF A01 CSCL 21D

Results of a study to determine the extent of the present onsite use of waste fuel in industrial boilers and related process equipment, the nature and quantities of the materials so disposed of, and current regulations concerning such use are presented. Based on contacts with federal, state, and local environmental protection officials, industry personnel, and the open literature, the study concludes that: a wide variety of materials are burned as fuel in standard or appropriately modified combustion equipment; the practice can be exposed to expand due to the economic pressures of hazardous waste disposal and rising fossil fuel costs; and virtually no emission data on waste fuel combustion (except through incineration) is available. GRA

N82-11657# TRW, Inc., McLean, Va. Energy Systems Group.
ENVIRONMENTAL RESEARCH PLAN FOR GAS SUPPLY TECHNOLOGIES. VOLUME 1: EXECUTIVE SUMMARY Final Report
L. M. Tipton and P. D. Junkin 29 May 1981 78 p refs 2 Vol.
(Contract GR1-5080-351-0316)
(PB81-222309; GRI-80/0013.1) Avail: NTIS HC A05/MF A01 CSCL 21D

The environmental impacts and constraints associated with gas supply technologies are summarized. Specific environmental research needs based on state of the art technology and current environmental knowledge are identical. Technologies considered include those producing: unconvential natural gas (tight gas sands, Devoian shale, coalbed methane, and geopressured methane), SNG from coal and peat and SNG from biomass (land based, water based and waste. GRA

N82-11658# Pacific Environmental Services, Inc., Elmhurst, Ill.
INDUSTRIAL PROCESS FUGITIVE EMISSIONS INVENTORY FOR THE REGION V GREAT LAKES SHORELINE Final Report
Charles Mackus and Eddy Lin 1980 261 p refs
(Contract EPA-68-01-4140)
(PB81-212037) Avail: NTIS HC A12/MF A01 CSCL 13B

The study revealed that approximately 229,000 to 531,000 tons of fugitive particulates were deposited into the Great Lakes during 1978. Large industrial cities such as Chicago, Gary, Cleveland, Toledo, Detroit, and Milwaukee were found to have the largest concentration of major fugitive emission sources. Iron and steel industries were found to be the largest fugitive emission sources bordering the lakes. T.M.

N82-11659# Office of Radiation Programs, Las Vegas, Nev.
AIRBORNE RADIOLOGICAL SAMPLING OF MOUNT ST. HELENS PLUMES
Vernon E. Andrews Apr. 1981 20 p refs
(PB81-213795; ORP-LVF-81-2) Avail: NTIS HC A02/MF A01 CSCL 13B

The samples were analyzed for uranium and thorium isotopes, radium -226, lead-210, polonium-210, and radon-222. Other laboratories analyzed samples to determine particle size distribution and elemental composition. The only samples containing radioactivity above normal ambient levels were collected on May 20. Polonium-210 concentrations in the plume, determined from a sample collected between 5 and 30 km from the crater, were approximately an order of magnitude above background. Radon-222 concentrations in samples collected from the plume centerline at a distance of 15 km averaged approximately four times the average surface concentrations. The small increases in radioactivity would cause no observable adverse health effects. GRA

N82-11660# Washington Univ., Seattle. Dept. of Civil Engineering.
EFFECTS OF PLANFORM GEOMETRY ON TIDAL FLUSHING AND MIXING IN MARINAS Final Report, Oct. 1978 - Sep. 1979
R. E. Nece, E. P. Richey, J. Rhee, and H. M. Smith Jun. 1981 84 p refs
(Grant EPA-R-806146)
(PB81-219537; EPA-600/3-81/039) Avail: NTIS HC A05/MF A01 CSCL 13B

Parameters investigated were: planform geometry aspect ratio; ratio of entrance cross-sectional area to basin planform area; effect of rounding of corners in the basin interior; orientation and of two entrances versus a single entrance. It is concluded that for rectangular planform basins, optimum exchange is achieved when the basin length to width (aspect) ratio lies between 0.5 and 2.0, the interior corners are rounded and the single

entrance centrally located on the seaward side of the harbor. T.M.

N82-11661# Research Triangle Inst., Research Triangle Park, N. C.
VAPOR-PHASE CRACKING AND WET OXIDATION AS POTENTIAL POLLUTANT CONTROL TECHNIQUES FOR COAL GASIFICATION Final Report, Nov. 1976 - Apr. 1981
W. J. McMichael, S. K. Gangwal, D. A. Green, and F. O. Mixon Jun. 1981 56 p refs
(PB81-219594; RTI/1934/00-01F; EPA-600/7-81-096) Avail: NTIS HC A04/MF A01 CSCL 13B

Bench-scale experiments were used to deterimine rates of hydrocracking and wet oxidation as a function of process conditions and catalyst used. A microreactor system, capable of holding 1.0 cc of material to be screened for catalytic activity, was used in the hydrocracking studies. Benzene and alkylated benzene compounds were used as model compounds in determining the potential of various materials fo cracking rates. Thiophene was used as a model compound for catalyst poisoning studies. Cracking rates were determined for coal-derived materials produced from bituminous and subbituminous coals and materials containing iron and nickel compounds. T.M.

N82-11662# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
CONTROL TECHNIQUES FOR SULFUR OXIDE EMISSIONS FROM STATIONARY SOURCES, SECOND EDITION
Apr. 1981 560 p refs
(Contract EPA-68-02-3173)
(PB81-220048; EPA-450/3-81-004) Avail: NTIS HC A24/MF A01 CSCL 13B

Available data on characterization and sampling methods for sulfur oxides, descriptions of stationary sources of sulfur oxides and control techniques used to reduce sulfur oxide emissions are presented. Control costs and energy and environmental impact of controlling sulfur oxide emissions are also discussed. T.M.

N82-11663# Arizona Univ., Tucson. Agricultural Experiment Station.
LINERS OF NATURAL POROUS MATERIALS TO MINIMIZE POLLUTANT MIGRATION Final Report, Oct. 1975 - Sep. 1977
Wallace H. Fuller Jul. 1981 86 p refs
(Grant EPA-R-803988)
(PB81-221863; EPA-600/2-81-122) Avail: NTIS HC A05/MF A01 CSCL 13B

The use of natural low-cost materials as barriers for minimizing pollution migration out of landfills by retaining contaminants from liquids was investigated. The relative effectiveness of natural low-cost liners of crushed limestone, clayey soil, hydrous oxides of iron, and crushed pecan hulls for minimizing the migration of Be, Cd, Cr, Fe, Ni, Zn, and total organic carbon constituents of municipal solid waste landfill leachates was evaluated. Several leachate variables such as aqueous dilution, aeration, pH, and flux were also studied for their effect on movement of metals through 11 representative U.S. soils. Laboratory investigations using soil columns as a first step in screening for potential liners and manipulation practices are described. Limestone and hydrous iron oxide were found to be potentially useful as porous liners for retention of metallic leachate constituents. The amounts of these materials in natural soil were also found to be useful predictors of contaminant removal. Author

N82-11664# Performance Development Inst., Washington, D.C.
INCENTIVES FOR TECHNOLOGICAL INNOVATION IN AIR POLLUTION REDUCTION: AN ETIP POLICY RESEARCH SERIES. VOLUME 6: INNOVATION BY REGULATION: THE ADMINISTRATION OF CONTROL TECHNOLOGY REQUIREMENTS UNDER THE CLEAN AIR ACT Interim Report
William H. Foskett, Adrieene Jamieson, and Jay Evans Mar. 1981 148 p refs
(Contract NBS-78-3603)
(PB81-221616; NBS-GCR-ETIP-81-93-Vol-6) Avail: NTIS HC A07/MF A01 CSCL 13B

Case histories and analysis regarding the impact on innovation and technology of certain provisions of the Clean Air Act are presented. Since new reforms are built on these requirements, their future is dependent on how they work. The report finds problems in the linkage between the Clean Air Act and industrial innovation. GRA

N82-11665# Performance Development Inst., Washington, D.C.
INCENTIVES FOR TECHNOLOGICAL INNOVATION IN AIR POLLUTION REDUCTION: AN ETIP POLICY RESEARCH SERIES. VOLUME 7: PERIODIC REVIEW AND TECHNOLOGICAL ESCALATION OF PERFORMANCE STANDARDS: NEW SOURCE PERFORMANCE STANDARDS REVIEW PROCESS
William H. Foskett and Terry Olesen Dec. 1980 43 p refs
(Contract NBS-78-3603)
(PB81-218117; NBS-GCR-ETIP-81-94-Vol-7) Avail: NTIS HC A03/MF A01 CSCL 13B

The review was mandated in order to incorporate technological advances that take place since the standards' original formulation. It is shown that revisions are seldom made raising the question as to whether technological advances are overlooked or are non-existent. T.M.

N82-11666# Performance Development Inst., Washington, D.C.
INCENTIVES FOR TECHNOLOGICAL INNOVATION IN AIR POLLUTION REDUCTION: AN ETIP POLICY RESEARCH SERIES. VOLUME 8: CONTROLLED TRADING AND SITE-SPECIFIC SIP REVISIONS: COMPETING FOR ATTENTION IN A CROWDED ADMINISTRATIVE ROUTE Interim Report
Jay Evans Dec. 1980 108 p refs
(Contract NBS-78-3603)
(PB81-218273; NBS-GCR-ETIP-81-95) Avail: NTIS HC A06/MF A01 CSCL 13B

Factors regarding the impacts on innovation of regulatory incentives were studied. The report presents case studies and analysis showing how the success of these reforms is endangered by the slowness of the administrative route for approval in a state implementation plan (SIP). T.M.

N82-11667# Geological Survey, Lakewood, Colo. Water Resources Div.
RAINFALL-RUNOFF MODELING AND PRELIMINARY REGIONAL FLOOD CHARACTERISTICS OF SMALL RURAL WATERSHEDS IN THE ARKANSAS RIVER BASIN IN COLORADO Final Water-Resources Investigation
Russell K. Livingston 1981 49 p refs Prepared in cooperation with the Colorado Div. of Highways and the Federal Highways Administration, Washington, D.C.
(PB81-224313; USGS/WRD/WRI/81-059; USGS/WRI-80-112) Avail: NTIS HC A03/MF A01 CSCL 13B

Both observed and synthetic rainfall-runoff and annual peak-discharge data for 17 rural watersheds were analyzed to evaluate the magnitude, frequency, and volume of floods in the plains region of the Arkansas River basin in Colorado. The results from analysis of observed data were weighted or averaged with results from analysis of synthetic data to provide improved estimates of predicted flood characteristics. The 10-, 25-, 50-, and 100-year peak discharges were regionalized using multiple-regression and station-year methods. Relations were developed to determine peak discharge from contributing drainage area (standard error of estimate 30 to 50 percent) and flood volume from peak discharge (standard error of estimate 62 percent) for ungaged basins between 0.5 and 15 square miles in size. GRA

N82-11668# Clemson Univ., S.C. Water Resources Research Inst.
STABILIZATION CHARACTERISTICS OF DEPOSITS OF BIOLOGIC SOLIDS GENERATED IN AERATED LAGOONS
Linvil G. Rich Mar. 1981 39 p refs
(Contract DE-14-34-0001-9131)
(PB81-224297; WRRI-92; W81-03951; OWRT-B-123-SC(1)) Avail: NTIS HC A03/MF A01 CSCL 13B

Properly-designed dual-power-level multicellular lagoon systems should discharge effluents low both in suspended solids and biochemical oxygen demand. Solids that settle form deposits

in which bio-degradable materials decompose in a benthal environment. The rates of benthal stabilization were studied. A deposit formed at the bottom of an aerated water column that was primarily organic under conditions in which aerated lagoon solids were added on a semi-continuous basis was examined. Criteria for the sizing of lagoon cells and the specification of aeration equipment were developed. GRA

N82-11669# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
A GEOCHEMICAL AND SEDIMENTOLOGICAL STUDY OF THE DREDGED MATERIAL DEPOSIT IN THE NEW YORK BIGHT
R. Dayal, M. G. Heaton, M. Fuhrmann, and I. W. Duedall Feb. 1981 188 p refs Prepared in cooperation with State Univ. of New York at Stony Brook
(PB81-224107; NOAA-TM-OMPA-3; NOAA-81042701) Avail: NTIS HC A09/MF A01 CSCL 13B

Investigations of the dredged material deposit reveal that the sediments are composed of a wide variety of sediment types which can be classified as quartz and glauconitic sands, muds, sandy muds, gravel intermixed with muds, and artifact material such as coal and fly ash, wood, slag, metal flakes, glass, etc. Fine grained, black sandy mud is characteristic of dredged material. Glauconitic sand and gravelly quartzose sand are typical of the natural seiment underlying the deposit and in surrounding areas. The spatial distributions of heavy metals such as Pb, Cu, Ag, Hg, Cd, Fe, and Mn in the dredged material deposit exhibit highly variable and considerably elevated concentrations over those observed in sediment outside the deposit and in underlying natural sediment. GRA

N82-11670# University of Southern California, Los Angeles. Inst. for Marine and Coastal Studies.
THE PLANNING AND MANAGEMENT OF CALIFORNIA'S COASTAL RESOURCES Annual Report, 1979 - 1980
1981 132 p
(PB81-224057; NOAA-81042201) Avail: NTIS HC A07/MF A01 CSCL 13B

A report of the University of Southern California's tenth year of participation in the national Sea Grant program is given. Each year the USC Sea Grant program supports one or more projects in each of the following areas: socio-economic systems, living marine resources, non-living marine resources, coastal engineering, marine education, and advisory services. In 1979-80, the USC program supported the following projects: Heterotrophic metabolism of marine dinofiagellates; The role of natural populations of microheterotrophs in carbon cycling in Southern California; Ecology of small tidal lagoon under the influence of urban recreational use; Southern California's nearshore environment: A significant fish nursery; Sediment accumulation and the history of pollution accumulation in San Francisco Bay; Offshore sand and gravel resources, Orange County, California; The port authority as a public enterprise; Problems of harbor modeling. GRA

N82-11671# Environmental Protection Agency, Las Vegas, Nev. Exposure Assessment Research Div.
GEOTHERMAL ENVIRONMENTAL ASSESSMENT: BEHAVIOR OF SELECTED GEOTHERMAL BRINE CONTAMINANTS IN PLANTS AND SOILS Final Report
K. W. Brown Jun. 1981 36 p refs
(PB81-222333; EPA-600/4-81-052) Avail: NTIS HC A03/MF A01 CSCL 13B

The behavior of selected elements found in the Roosevelt Hot Springs KGRA geothermal fluids was investigated in both plant and soil systems. The kinetics of these potential environmental containments were studied by using soil columns and selected cultivated and native plant species. GRA

N82-11672# GCA Corp., Bedford, Mass. Technology Div.
NEW HAMPSHIRE AND VERMONT POINT SOURCE INVENTORY UPDATE FOR NECRMP Final Report
Mahesh C. Shah, Sue Ellen Haupt, and John N. McHenry Apr. 1981 32 p refs
(Contract EPA-68-02-3510)
(PB81-219339; GCA-TR-80-126-G; EPA-450/4-81-017) Avail: NTIS HC A03/MF A01 CSCL 13B

The inventories are for subsequent use in the northeast corridor regional modeling project (NECRMP). Sources meeting the prescribed criteria were identified. Updated data were obtained from the state agencies and processed into NEDS. GRA

N82-11673# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Physical Sciences and Engineering.
EVALUATION OF EXHAUST EMISSIONS DATA FOR DIESEL ENGINES USED IN UNDERGROUND MINES
John W. Sheehy Sep. 1980 50 p refs
(PB81-225377; DHHS/PUB/80-146) Avail: NTIS HC A03/MF A01 CSCL 06J

Diesel exhaust pollutants evaluated were nitrogen oxide (10102439) (NO), carbon nonoxide (630080) (CO), and carbon dioxide(124389) (CO2). The pollutants were collected from 4,6,8, and 12 cylinder indirect injection engines prior to installation of any emission control device. NO emissions ranged from 3.8 to 6.0 grams per brake horsepower hour (gm/bhphr). The lowest NO emissions were from the 6 cylinder engine, and highest emissions were produced by the 8 cylinder engine. CO2 exhaust emissions ranged from 580 to 812 gm/bhphr. Average CO2 emissions from the turbocharged aftercooled (TA) engines were 21 percent lower than from the naturally aspirated (NA) engines, and the methane 74828) atmosphere slightly reduced CO2 emissions. CO emissions ranged from 0.8 to 2.4 gm/bhphr. CO emissions from the TA engine were much lower than CO emissions from any of the NA engines. T.M.

N82-11674# Kentucky Univ., Lexington.
USE OF A VEGETATIVE FILTER ZONE TO CONTROL FINE-GRAINED SEDIMENTS FROM SURFACE MINES Final Report
Steven C. Albrecht (Hittman Associates, Inc., Lexington, Ky.) and Billy J. Barfield Mar. 1981 171 p refs Prepared in cooperation with Kentucky Dept. of Natural Resources and Environmental Protection
(PB81-226110) Avail: NTIS HC A08/MF A01 CSCL 08M

This project was initiated with the specific purpose of conducting a field test on vegetation as a viable sediment trapping medium. The project was designed for a field evaluation under typical mining conditions. The filter area was constructed directly below an abandoned surface mine bench, on typical soil types found in mined areas of Eastern Kentucky. The outslope located above the filter was the primary area from which sediment-laden drainage was to be diverted to the inlet monitoring station. Sediment-laden water samples were collected at the inlet flume for comparison with samples collected at the outlet flume to permit evaluation of the sediment removal capability of the vegetative filter. GRA

N82-11675# General Accounting Office, Washington, D. C.
BETTER MONITORING TECHNIQUES ARE NEEDED TO ASSESS THE QUALITY OF RIVERS AND STREAMS, VOLUME 1 Report to the Congress
30 Apr. 1981 135 p refs 2 Vol.
(PB81-225286; CED-81-30-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 13B

The Environmental Protection Agency and the Geological Survey use sampling networks to assess the quality of the Nation's rivers and streams. The Council on Environmental Quality strongly endorses this approach and uses the water quality data from the networks in its annual environmental reports. Water quality is far too complex to be monitored by these networks. Small samples, generally taken monthly cannot account for water quality at individual sites and cannot accurately represent other locations on the same river. Nationwide reports based on data from the networks are not reliable. Special studies of individual rives of river segments would yield more scientifically sound and useful information on water quality. GRA

N82-11676# General Accounting Office, Washington, D. C.
BETTER MONITORING TECHNIQUES ARE NEEDED TO ASSESS THE QUALITY OF RIVERS AND STREAMS, VOLUME 2 Report to the Congress
30 Apr. 1981 212 p 2 Vol.
(PB81-225294; CED-81-30-Vol-2) Avail: NTIS HC A10/MF A01 CSCL 13B

Detailed agency comments are presented. The evaluation

by GAO and its consultant of monitoring methods is provided. T.M.

N82-11677# National Bureau of Standards, Washington, D.C. National Measurement Lab.
TECHNICAL ACTIVITIES OF THE OFFICE OF ENVIRONMENTAL MEASUREMENTS - 1980
William K. Kirchhoff May 1981 195 p
(PB81-227860; NBSIR-81-2280) Avail: NTIS HC A09/MF A01 CSCL 13B

Water and air measurements are summarized. The measurements were reviewed for standards development and methods development. T.M.

N82-11678# Cramer (H.E.) Co., Inc., Salt Lake City, Utah.
CALCULATIONS FROM COMPLIANCE EMISSIONS OF LONG AND SHORT TERM SO2 CONCENTRATIONS IN THE SOUTHWEST PENNSYLVANIA AIR QUALITY CONTROL REGION Final Report, 1979 - 1980
May 1981 235 p refs
(Contract EPA-68-02-2547)
(PB81-226078; TR-81-136-01; EPA-903/9-81-001) Avail: NTIS HC A11/MF A01 CSCL 13B

The results of dispersion model calculations of maximum annual, 24 hour and 3 hour average ground level SO2 concentrations for selected areas in the region (AQOR) is described. The primary purpose of the model calculations was to assist EPA Region III and the Pennsylvania Department of Environmental Resources in determining the attainment of nonattainment of the National Ambient Air Quality Standards (NAAQS) for SO2 in the Beaver Valley and Monongahela Valley Air Basins exclusive of Allegheny County. all of the dispersion model calculations were made using the LONGZ and SHORTZ dispersion models with 1980 compliance emissions inventories containing 492 major SO2 sources located within the AQOR and in Ohio and West Virginia near the western border of the AQOR. T.M.

N82-11679# PEDCo-Environmental, Inc., Cincinnati, Ohio.
EPA UTILITY FGD (FLUE GAS DESULFURIZATION) SURVEY Quarterly Report, Jan. - Mar. 1981
M. Smith, M. Melia, N. Gregory, and K. Scalf Aug. 1981 308 p refs
(Contract EPA-68-01-6310)
(PB81-225773; EPA-600/7-81-012C) Avail: NTIS HC A14/MF A01 CSCL 13B

Information contributed by the utility industry, process suppliers, regulatory agencies, and consulting engineering firms is summarized. Domestic FGD systems are tabulated alphabetically by development status (operational, under construction, or in planning stages), utility company, process supplier, process and waste disposal practice. Data on boiler design, FGD system design, fuel characteristics, and actual performance are presented. Unit by unit dependendability parameters, and problems and solutions associated with the boiler and FGD systems are discussed. Process flow diagrams and FGD system economic data are also presented. T.M.

N82-11680 Maryland Univ., College Park.
SELECTED STUDIES OF FOUR HIGH-TEMPERATURE AIR-POLLUTION SOURCES Ph.D. Thesis
Mark Steven Germani 1980 406 p
Avail: Univ. Microfilms Order No. 8121096

The atmospheric emissions of five copper smelters, a coal-fired power plant, a municipal incinerator and the Mt. Erebus volcano in Antarctica were examined. Many chalcophilic elements, e.g., As, Se, Pb, Cd, Zn, W and in, are strongly enriched with respect to the Earth's crustal abundance pattern in particulate material emitted from copper smelters. Vapor-phase concentrations of several elements in a high temperature gas stream and tested at a coal-fired power plant were determined and compared with those from a municipal incinerator. The results from the coal-fired power plant and incinerator indicate that 5-10 times more Hq is emitted from the power plant. Particulate and vapor-Erebus show large enrichments for many elements, most notably the volatile chaicophilic elements, As, Se, In, Cd and Sb, and the halogens, F, Cl and Br. About 95% of the Cl, 24% of the As and > 90% of the F are present in the vapor phase. High concentrations of F are present in the lava lake as evidenced by the ratio of Cl to F found in the vapor-phase samples. Dissert. Abstr.

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-11681 California Univ., Los Angeles.
MONTE CARLO CALCULATIONS OF THE MELTING POINT OF IRON AT CORE PRESSURES Ph.D. Thesis
Robert Stephen Abelson 1981 188 p
Avail: Univ. Microfilms Order No. 8120914

The melting point of iron at pressures in the Earth's core places strong constraints on the temperature in the Earth's core. The melting point was determined from its thermodynamic definition, that the Gibb's free energies of the solid and liquid phases are equal. The Monte Carlo simulations can generate accurate equations of state (EOS) of solids and liquids if the forces between the atoms are understood as evident by their successful modeling of the EOS argon and other rare gases. These computer simulations were successful in locating the melting transitions by elaborate techniques of determining the Gibb's free energies from the equations of state of the solid and liquid phases. This justifies the use of the Monte Carlo method. Dissert. Abstr.

N82-11682 Colorado Univ. at Boulder.
THE QUANTITATIVE RECOGNITION AND EVALUATION OF SEISMIC QUIESCENCE: APPLICATIONS TO EARTHQUAKE PREDICTION AND SUBDUCTION ZONE TECTONICS Ph.D. Thesis
Ray Edward Habermann 1981 276 p refs
Avail: Univ. Microfilms Order No. 8122288

Teleseismically recorded earthquake hypocenters are the only geophysical data related to earthquake occurrence continuously available for many regions of the world. The recognition of patterns in these data which may indicate that preparation for a great event has begun, if they exist, is essential for earthquake prediction in these regions. Techniques for quantitatively recognizing such rate decreases and evaluating their spatial and temporal uniqueness were developed and applied to several seismically active regions of the world. Dissert. Abstr.

N82-11683 Colorado Univ. at Boulder.
GEOLOGY OF THE NAHCOLITE DEPOSITS AND ASSOCIATED OIL SHALES OF THE GREEN RIVER FORMATION IN THE PICEANCE CREEK BASIN, COLORADO Ph.D. Thesis
John Richard Dyni 1981 182 p
Avail: Univ. Microfilms Order No. 8122279

Stratigraphic and lithologic studies of drill cores from 10 exploratory holes reveal that five eights of the nahcolite resource, occurs as crystalline aggregates in maristone. The remainder of the resource consists of laterally continuous zones of disseminated nahcolite in maristone and beds of mixed nahcolite and halite. Sedimentologic data indicate that the maristones and associated sodium minerals were deposited by pelagic, turbiditic, and evaporitic processes in a permanent alkaline lake. Lower lake waters and sediments favored high rates of bacterial reduction of sulfate and hydrolysis of fine grained detrital silicate minerals. These processes resulted in production of bicarbonate and the formation of an authigenic suite of carbonate and silicate minerals devoid of clay and sulfate minerals. Cyclic probably seasonal, stratification is recorded by the laminated maristones and in some units of disseminated and bedded nahcolite and halite. The vertical distribution of total sulfur in the maristones is also cyclic and may be related to evaporative phases of the lake. Dissert. Abstr.

N82-11684 Cornell Univ., Ithaca, N. Y.
COCORP TRAVERSES IN WYOMING AND OKLAHOMA Ph.D. Thesis
Jonathan Andrew Brewer 1981 153 p

Avail: Univ. Microfilms Order No. 8119544

Deep crustal seismic reflection data recorded by the Consortium for Continental Reflection Profiling (COCORP) project are processed and interpreted to study the deep structure of continental crust in Wyoming and Oklahoma. The Wyoming data were recorded across the Wind River and Laramie Mountains, two of a series of massive basement uplifts formed during the Laramide orogeny. The COCORP traverse across the Wind River Mountains recorded reflections from a moderately dipping thrust fault that can be traced to middle and possibly lower crustal depths. The mountains were uplifted along this thrust by compression and shortening of the Earth's crust. Numerous other events were recorded on the seismic profiles and these data provide some of the detailed crustal sections yet obtained by COCORP. These COCORP profiles, recorded across mountain ranges lying within the North American craton, demonstrate the utility of deep seismic reflection profiling in delineating the deep structure of continental crust, its mode of deformation and geological history. Dissert. Abstr.

N82-11685 Cornell Univ., Ithaca, N. Y.
STUDIES OF CONTINENTAL AND OCEANIC CRUST FROM SEISMIC, GEODETIC AND MAGNETIC OBSERVATIONS Ph.D. Thesis
Frank Steve Schilt 1981 206 p refs
Avail: Univ. Microfilms Order No. 8119516

Geophysical data were used to infer geological conclusions related to the evolution and tectonics of the earth's crust. A study of plate kinematics based on oceanic magnetic anomalies was conducted. Leveling observations were used to investigate recent vertical crustal movements. Deep crustal seismic reflection profiles are presented. Dissert. Abstr.

N82-11686 Cornell Univ., Ithaca, N. Y.
ELECTRICAL CONDUCTIVITY STRUCTURE OF THE SAN ANDREAS FAULT IN CENTRAL CALIFORNIA Ph.D. Thesis
Wayne Jude Phillips 1981 119 p
Avail: Univ. Microfilms Order No. 8119465

The electrical conductivity structure of a section of the San Andreas fault is investigated by means of an electromagnetic induction experiment utilizing a grounded electric dipole source. The results indicate a sharp contrast in conductivity across the fault zone. The resistivity of the sediments on the northeast side of the fault is approx. 20 ohm-m compared to 1000 ohm-m for the Gabilan granites on the southwest side. There is evidence for a zone of high conductivity beneath the Gabilans. A gravity survey in the areas indicates the presence of a pocket of low density rocks located approx. 1 to 9 Km beneath the Gabilans and 2 Km southwest of the surface trace of the fault. The depth to the conducting layer there correlates resonably well with the upper bound of these rocks. Further away from the fault there is a discontinuity in seismic velocity at 12 Km. The depth to the conducting layer in this area is 13 Km. Farther from the fault zone the seismic velocities and electrical conductivity at depth are consistent with the hypothesis that the Gabilans are underlain by a slab of oceanic crust. Dissert. Abstr.

N82-11687 California Univ., Los Angeles.
LOCAL EARTHQUAKE TRAVEL TIMES AND SPATIAL VARIATIONS OF CRUSTAL VELOCITY IN SOUTHERN CALIFORNIA Ph.D. Thesis
Raymond Andrew Ergas 1981 130 p
Avail: Univ. Microfilms Order No. 8120944

Measurements of P-wave arrival times from local earthquakes contain information about differences in crustal velocity within a region. Using 32,000 arrival times recorded by a seismic array in southern California, these spatial variations in velocity were estimated. A statistical model of the behavior of travel time residuals derived from a laterally homogeneous velocity model accounts for the major sources of error in the recording and hypocenter location processes, and leads to a set of editing procedures to remove aberrant data. Edited data were inverted under a variety of assumptions to estimate a laterally varying veocity model using a variation on a method originally developed for teleseismic data. The improvement in the residuals due to the new velocity models is statistically significant. The inversion method appears to underestimate the size of the velocity contrasts, but the results are generally consistent with those obtained using other types of data. A major result is that the Peninsular Ranges have substantially higher average velocity than nearby regions, probably due to differences in crustal tickness and composition. Dissert. Abstr.

N82-11688*# SRI International Corp., Menlo Park, Calif.
IMPROVED SIMULATION OF AEROSOL, CLOUD, AND DENSITY MEASUREMENTS BY SHUTTLE LIDAR Final Report
Philip B. Russell, Bruce M. Morley, John M. Livingston, Gerald W. Grams (Georgia Inst. of Tech.), and Edward W. Patterson Washington NASA Nov. 1981 165 p refs
(Contract NAS1-16052)
(NASA-CR-3473) Avail: NTIS HC A08/MF A01 CSCL 04A

Data retrievals are simulated for a Nd:YAG lidar suitable for early flight on the space shuttle. Maximum assumed vertical and horizontal resolutions are 0.1 and 100 km, respectively, in the boundary layer, increasing to 2 and 2000 km in the mesosphere. Aerosol and cloud retrievals are simulated using 1.06 and 0.53 microns wavelengths independently. Error sources include signal measurement, conventional density information, atmospheric transmission, and lidar calibration. By day, tenuous clouds and Saharan and boundary layer aerosols are retrieved at both wavelengths. By night, these constituents are retrieved, plus upper tropospheric, stratospheric, and mesospheric aerosols and noctilucent clouds. Density, temperature, and improved aerosol and cloud retrievals are simulated by combining signals at 0.35, 1.06, and 0.53 microns. Particlate contamination limits the technique to the cloud free upper troposphere and above. Error bars automatically show effect of this contamination, as well as errors in absolute density nonmalization, reference temperature or pressure, and the sources listed above. For nonvolcanic conditions, relative density profiles have rms errors of 0.54 to 2% in the upper troposphere and stratosphere. Temperature profiles have rms errors of 1.2 to 2.5 K and can define the tropopause to 0.5 km and higher wave structures to 1 or 2 km. Author

N82-11689# Air Force Geophysics Lab., Hanscom AFB, Mass.
STRATOSPHERIC TRACE GAS COMPOSITION STUDIES UTILIZING IN SITU CRYOGENIC, WHOLE-AIR SAMPLING METHODS
Charles C. Gallagher, Charles A. Forsberg, Robert V. Pieri, and Gerald A. Faucher 10 Mar. 1981 50 p refs
(AF Proj. 6687)
(AD-A104375; AFGL-TR-81-0071; AFGL-ERP-732) Avail: NTIS HC A03/MF A01 CSCL 04/1

A balloon borne cryogenic whole air sampler (tri-sampler) is used to obtain one-mole sample quantities at each of three altitudes on a single flight. Samples have been obtained at six altitudes from 12 to 30 km at each of five latitudes from 9 deg N to 64 deg N. The samples are maintained frozen until just prior to analysis; chemiluminescence and gas chromatography techniques are used to determine mixing ratios of NO, NO2, N2O, CFC13 and CF2C12. Variations in mixing ratios with altitude and latitude have been noted, but no variations with time within the stratosphere have been detected over the five-year duration of the flights. Gas calibration procedures include two dynamic dilution methods and one permeation tube method, with close agreement among the methods being noted. Author (GRA)

N82-11690*# *Environmental Research and Technology, Inc.*, Concord, Mass.
VARIATIONS IN ATMOSPHERIC ANGULAR MOMENTUM Technical Report, 1 Jan. 1976 - 31 Dec. 1980
Richard D. Rosen and David A. Salstein Jun. 1981 50 p refs
(Contract NAS5-25870)
(NASA-CR-166712; ERT-TR-A345-T1) Avail: NTIS HC A03/MF A01 CSCL 04A

Twice-daily values of the atmosphere's angular momentum about the polar axis during the five years from 1976 through 1980 are presented in graphs and a table. The compilation is based on a global data set, incorporating 90 perent of the mass of the atmosphere. The relationship between changes in the angular momentum of the atmosphere and changes in the length of day is described, as are the main sources of error in the data. The variability in angular momentum is revealed in a

preliminary fashion by means of a spectral decomposition. The data presented shoul stimulate comparisons with other measures of the length of day and so provide a basis for greater understanding of Earth-atmosphere interactions. J.M.S.

N82-11691*# Lunar and Planetary Inst., Houston, Tex.
WORKSHOP ON EARLY CRUSTAL GENESIS: IMPLICATIONS FROM EARTH
William C. Phinney, comp. 1981 48 p refs Workshop held at Houston, Tex., 3-5 Nov. 1980
(Contract NASw-3389)
(NASA-CR-164944; LPI-TR-81-04) Avail: NTIS HC A03/MF A01 CSCL 08G

Ways to foster increased study of the early evolution of the Earth, considering the planet as a whole, were explored and recommendations were made to NASA with the intent of exploring optimal ways for integrating Archean studies with problems of planetary evolution. Major themes addressed include: (1) Archean contribution to constraints for modeling planetary evolution; (2) Archean surface conditions and processes as clues to early planetary history; and (3) Archean evidence for physical, chemical and isotopic transfer processes in early planetary crusts. Ten early crustal evolution problems are outlined. A.R.H.

N82-11692# National Center for Atmospheric Research, Boulder, Colo.
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH Annual Report, fiscal year 1980
Mar. 1981 90 p
(NCAR/AR-80) Avail: NTIS HC A05/MF A01

Research and development highlights of the Advanced Study Program, the Atmospheric Analysis and Prediction Division, the Atmospheric Chemistry and Aeronomy Division, the Convective Storms Division, and the Monsoon Experiment are presented. Administrative support for the projects is discussed. A financial summary for the center is provided. A list of publications for the calendar year 1979 is given. T.M.

N82-11693# Indian Inst. of Geomagnetism, Bombay.
GEOMAGNETIC OBSERVATIONS Annual Report, 1979 - 1980
Nanabhai Moos Marg 1980 70 p
Avail: NTIS HC A04/MF A01

Results are summarized for the following areas of investigation: (1) quiet and disturbed day variation in the low and equatorial latitudes; (2) electromagnetic induction; (3) magnetosphere and solar wind; (4) aeronomy; (5) effects of the interplanetary magnetic field; (6) solar terrestrial relationships; (7) geomagnetic lunar daily variations; and (8) sola eclipse effects on HF radio propagation. Data processing, analysis, and dissemination activities are disussed as well as national and international cooperation in various projects including the International Magnetospheric study, the World Magnetic Archives Project, and MAGSAT. A.R.H.

N82-11694*# California Inst. of Tech., Pasadena. Seismological Lab.
HOTSPOTS, POLAR WANDER, MESOZOIC CONVECTION AND THE GEOID
Don L. Anderson 10 Nov. 1981 19 p refs Revised
(Grant NsG-7610)
(NASA-CR-164943) Avail: NTIS HC A02/MF A01 CSCL 08K

The geoid bears little relation to present tectonic features of the earth other than trenches. The Mesozoic supercontinent of Pangea, however, apparently occupied a central position in the Atlantic-African geoid high. This and the equatorial Pacific geoid high contain most of the world's hotspots. The plateaus and rises in the western Pacific formed in the Pacific geoid high and this may have been the early Mesozoic position of Pacifica, the fragments of which are now the Pacific rim portions of the continents. Geoid highs which are unrelated to present subduction zones may be the former sites of continental aggregations and mantle insulation and, therefore, hotter than normal mantle. The pent-up heat causes rifts and hotspots and results in extensive uplift, magmatism, fragmentation and dispersal of the continents and the subsequent formation of plateaus, aseismic ridges and seamount chains. Convection in the uppermantle would then be due to lateral temperature gradients as well as heating from below and would be intrinsically episodic. Author

N82-11695*# Texas Univ. at Arlington. Inst. for Geophysics.
CRUSTAL DEFORMATION AND SEISMIC MEASUREMENTS IN THE REGION OF MCDONALD OBSERVATORY, WEST TEXAS Final Technical Report
H. James Dorman 30 Jun. 1981 134 p refs
(Grant NsG-7159)
(NASA-CR-164964) Avail: NTIS HC A07/MF A01 CSCL 08K

The arrival times of regional and local earthquakes and located earthquakes in the Basin and Range province of Texas and in the adjacent areas of Chihuahua, Mexico from January 1976 to August 1980 at the UT'NASA seismic array are summarized. The August 1931 Texas earthquake is reevaluated and the seismicity and crustal structure of West Texas is examined. A table of seismic stations is included. A.R.H.

N82-11696*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
STUDY OF THE TIME EVOLUTION OF THE LITHOSPHERE Semiannual Progress Report, 1 Mar. - 31 Aug. 1981
Micheline C. Roufosse Nov. 1981 7 p
(Grant NAG5-150)
(NASA-CR-164968; SAPR-1) Avail: NTIS HC A02/MF A01 CSCL 08G

A three dimensional geoid of all oceanic regions was obtained using a data set derived from the GEOS-3 radar altimeter. The editing and organization of the complete SEASAT geophysical data set are described. The geographical area located between 25 and 35 degrees south, and between 320 and 335 degrees east, around the Rio Grande Rise in the south Atlantic, was selected for continued study. T.M.

N82-11697*# National Aeronautics and Space Administration, Washington, D. C.
MERIDIONAL HEAT TRANSPORT AT THE ONSET OF WINTER STRATOSPHERIC WARMING
Michele Conte Sep. 1981 10 p refs Transl. into ENGLISH from Rev. di Meterol. Aeron., v. 40, Oct. - Dec., 1980 p 303-307 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by National Aeronautical Meteorology and Climatology Center, Rome
(Contract NASw-3541)
(NASA-TM-76614) Avail: NTIS HC A02/MF A01 CSCL 04A

A continuous vertical flow of energy toward high altitude was verified. This process produced a dynamic instability of the stratospheric polar vortex. A meridional heat transport was primed toward the north, which generated a warming trend. S.L.

N82-11698*# Oregon Univ., Eugene.
FAR-INFRARED MEASUREMENTS OF TRACE GASES Final Technical Report
I. G. Nolt and J. V. Radostitz Sep. 1980 6 p refs
(Grant NsG-7360)
(NASA-CR-164965) Avail: NTIS HC A02/MF A01 CSCL 04A

A better detector system was developed for far infrared spectroscopy by usng cryogenic technology to cool bolometric detectors to approximately 0.4K. Technical assistance was provided to two submillimeter infrared balloon experiment (SIBEX) flights which demonstrated the diagnostic capability of far IR emission spectroscopy. It is estimated that more than a hundred spectral emission features were detected which are not due to the main emitting gases O3, O2, and H2O. The trace species sources for many features still remain unidentified and the spectra obtained during the SIBEX flights present a new source of information on stratospheric composition. A.R.H.

N82-11699# Alaska Univ., Fairbanks. Geophysical Inst.
IMPERFECT MAGNETOSPHERE-IONOSPHERE COUPLING AND DISCRETE AURORAS Final Report, 1 Jan. 1979 - 31 Dec. 1980
J. R. Kan Hanscom AFB, Mass. AFGL Apr. 1981 31 p refs
(Contract F19628-79-C-0046; AF Proj. 2311)

(AD-A104509; AFGL-TR-81-0222) Avail: NTIS HC A03/MF A01 CSCL 04/1

Recent theoretical developments on the formation of discrete auroras are reviewed to assess the progress of our understanding of discrete auroral phenomenon. In spite of the great complexity involved, a unified physical picture begins to emerge in which the roles of various auroral acceleration processes can be identified in the context of magnetosphere-ionosphere coupling. Potential drops for the formation of inverted V precipitations are supported predominantly by a combination of double layer and pitch angle anisotropy processes. Additional electron energizations for the formation of thin auroral arcs are most likely due to filamentations of electrostatic ion cyclotron turbulence along the inverted V field lines. The discrete auroras can be understood as a manifestation of the imperfect coupling state of the magnetosphere-ionosphere interaction due to enhanced magnetospheric convection. Author (GRA)

N82-11700# Hawaii Univ., Honolulu.

PLASMASPHERIC, FARADAY AND TOTAL ELECTRON CONTENTS, 1977 AND 1978 Final Report, Oct. 1977 - Nov. 1980

Thomas H. Roelofs Hanscom AFB, Mass. AFGL Dec. 1980 843 p

(Contract F19628-78-C-0050; AF Proj. 4643)

(AD-A104362; AFGL-TR-81-0143) Avail: NTIS HC A99/MF A01 CSCL 04/1

These volumes contain the experimental results of monitoring the Faraday rotation and group delay of VHF and UHF signals transmitted from the ATS-6 geostationary satellite at a station located at Palehua, Hawaii. The Faraday rotation data represents the electron content measured out to a vertical height of approximately 2000-3000 kilometers, while the group delay is a measure of the total electron content along the entire path from station to the ATS-6 satellite. The difference between these two measures of electron content has been defined as the plasmaspheric electron content along the slant path from heights above 2000-3000 kilometers to the ATS-6 satellite. Also included in the data tables are values of the equivalent vertical slab thickness defined as the ratio of vertical electron content obtained by the Faraday rotation measurement divided by the density at the peak of the ionospheric F region obtained from measurements of fOF2 from the Maui Ionosonde. Author (GRA)

N82-11701# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.

HIGH LATITUDE ELECTRON DETECTORS ON SATELLITE P78-1: PRELIMINARY DATA RESULTS Final Report

Roger P. Vancour 4 May 1981 30 p

(AF Proj. 7601)

(AD-A104518; AFGL-TR-81-0131; AFGL-ERP-744) Avail: NTIS HC A03/MF A01 CSCL 04/1

Air Force satellite P78-1 carries several experiments investigating solar activity and charged particle and electromagnetic radiation measurements. One of these experiments consists of a set of electrostatic analyzers to collect electrons from 50 eV to 20 KeV in 16 channels. The sensors are exactly the same as the SSJ/3 sensor on DMSP satellites. Since the satellite is spinning at a rate of 11 + or - 1 rpm, complete pitch angle information is obtained in about 5.45 sec by each of the two sensors which are 90 degrees apart. Three passes are reported, showing where each pass is during a different intensity of magnetic activity. Oval boundaries, spectral shapes, and total energy fluxes are determined and compared to the results of others. Results from the two sensors are compared to each other. Author (GRA)

N82-11702# Air Force Geophysics Lab., Hanscom AFB, Mass.

A SIMPLIFIED PROCEDURE FOR DIRECT DETERMINATION OF REAL HEIGHTS FROM VIRTUAL HEIGHT DATA

Milton M. Klein 6 Mar. 1981 26 p refs

(AF Proj. 2310)

(AD-A104374; AFGL-TR-81-0070; AFGL-ERP-731) Avail: NTIS HC A03/MF A01 CSCL 04/1

As part of an effort to determine electron density profiles in the auroral region of the ionosphere, a method was developed for directly calculating real height from ionosonde data obtained at high latitudes. The method has been modified and simplified by representing the entire dispersion curve by a single power-law curve with only one parameter. The resulting real height-virtual height relation can now be solved in a simple way for the real height. To test the accuracy of the method, virtual heights were computed for two parabolic models of the ionosphere, and the corresponding real height values were then obtained by the present method. The results obtained showed that the calculated values of real height were in very good agreement with the exact values of real height. To indicate the improvement obtainable with the introduction of additional parameters, a two-parameter function, which gives a somewhat more accurate representation of the dispersion curve than does the one-parameter function, was obtained for one case. However, the amount of computational labor required is considerably greater than that required for the present method. In view of its simplicity and accuracy, it is felt that the one-parameter method is a useful analytic tool for determining real height from ionosonde data. Author (GRA)

N82-11703# Air Force Geophysics Lab., Hanscom AFB, Mass. Aeronomy div.

ROCKET DATA OF SOLAR EUV FLUX, THERMOSPHERIC ELECTRON FLUX AND N2 SECOND-POSITIVE AIRGLOW EMISSION Interim Scientific Report

R. A. VanTassel, W. J. McMahon, and L. Heroux 17 Apr. 1981 52 p refs

(AF Proj. 6690)

(AD-A104384; AFGL-TR-81-0111; AFGL-ERP-737) Avail: NTIS HC A04/MF A01 CSCL 04/1

This report presents simultaneous measurements of solar EUV flux, thermospheric photoelectron energy flux, and airglow radiation from the nitrogen second positive band system made from an Aerobee 170 rocket launched from White Sands Missile Range on 14 August 1979 at 2020 UT. The solar EUV data are combined with flux measurements obtained by H. E. Hinteregger with the solar EUV spectrometer on the Atmospheric Explorer-E satellite to provide flux measurements over the complete range of 51 to 1026 A. The energy range of the electron flux extends from 2.4 to 5.7 eV and from 14 to 34 eV. The airglow emission from the 0, 0 band of the nitrogen second positive system is presented as both volume and column rates. The volume emission rate shows a major broad peak near 150 km and a less intense peak at 108 km. Author (GRA)

N82-11704# Air Force Geophysics Lab., Hanscom AFB, Mass.

REPORT ON RESEARCH AT AFGL Interim Report, Jul. 1976 - Dec. 1978

John F. Dempsey, ed. Nov. 1980 224 p refs

(AF Proj. 9993)

(AD-A104513; AFGL-TR-80-0365; AFGL-SR-227) Avail: NTIS HC A10/MF A01 CSCL 14/2

This report continues a series of eight reports on Research at the Air Force Geophysics Laboratory. This report covers a two-and-one-half-year interval. It was written primarily for Air Force and DOD managers of research and development and more particularly for officials in Headquarters Air Force Systems Command, for the Director of Laboratories (DL), and for the Commanders of and the Laboratories within DL. It is intended that the report will have interest to an even broader audience. Author (GRA)

N82-11705# Wentworth Inst., Boston, Mass.

DESIGN AND FABRICATION OF QUADRUPOLE ION MASS SPECTROMETER FOR UPPER ATMOSPHERE Scientific Report, Oct. 1979 - Sep. 1980

Edgar J. LeBlanc Jul. 1981 9 p

(Contract F19628-78-C-0017; AF Proj. 6687)

(AD-A104319; AFGL-TR-81-0223; SCIENTIFIC-3) Avail: NTIS HC A02/MF A01 CSCL 14/2

This report describes, in a quasi-historical format, the design and fabrication of component parts and assemblies used in an Upper Atmosphere Composition Research Program conducted by the Composition Branch of the Aeronomy Laboratory, for AFGL. GRA

N82-11706# Lockheed Missiles and Space Co., Palo Alto, Calif. Electro-Optics Lab.

APPLICATION OF VISIBLE MONOCHROMATIC AURORAL IMAGING DATA FOR MODELING INFRARED EARTH-LIMB

MORPHOLOGY Final Report, Sep. 1978 - Jan. 1981
J. B. Kumer, R. D. Sears, J. E. Evans, S. E. Harris, and R. M. Nadile 26 Jan. 1981 58 p refs
(Contract F19628-78-C-0217; AF Proj. 2310)
(AD-A104343; LMSC-D802558; AFGL-TR-81-0025) Avail: NTIS HC A04/MF A01 CSCL 04/1

A statistically comprehensive first-order auroral earth-limb data base at 2.7 and 4.3 microns is constructed from an existing 4278 and 6300 A, ground-based, all-sky TV data base, which includes approximately 200 hours of all-sky auroral data that are stored on video tape. Methods of modeling 2.7- and 4.3-micro auroral emissions on the basis of measurements of the aurora in the spectral regions (4278 A) and (6300 A) have been developed and verified against infrared data. 2.7-micron emission is modeled by the N(2D) + O2 yields NO + O mechanism. The 4.3-micron emission is modeled by two mechanisms, a relatively slower (5 to 25 min response time) mechanism due to emission by CO2, and a weaker but fast (1 to 10 s) mechanism that is indicated by the auroral data obtained 26 October 1978. In this effort, approximately 30 min of real-time auroral all-sky video data from each of the events 3/23/73 and 3/27/73 were digitized. The digitized data from the 3/23/73 event were used to construct a dynamic 2-dimensional model of auroral 2.7 and 4.3 micron earth-limb radiance over the 30 min observation period. It is seen that structure is more prominent for the relatively fast 2.7- and 4.3-micron mechanisms than for the slower CO2 4.3-micron mechanism. Author (GRA)

N82-11707# Photometrics, Inc., Woburn, Mass.
THE USE OF DMSP DIGITAL DATA FOR AURORAL MEASUREMENTS Final Report, 15 Jan. 1979 - 15 Jan. 1981
Gilbert Davidson 15 Feb. 1981 36 p
(Contract F19628-79-C-0066; AF Proj. 2310)
(AD-A104392; PHM-01-81; AFGL-TR-81-0105) Avail: NTIS HC A03/MF A01 CSCL 04/1

Using measurements of aurora made by ground and aircraft based photometers and correlated in space and time with DMSP observations, two DMSP night time sensors have been calibrated. A procedure has been developed for computer reduction and analysis of the calibrated DMSP digital tape data. Author (GRA)

N82-11708# Bedford Research Associates, Mass.
TWO VARIABLE MODELLING OF EQUATORWARD BOUNDARY OF AURORAL PRECIPITATION
P. Tsipouras and N. Scotti 9 Jun. 1981 17 p refs
(Contract F19628-80-C-0124; AF Proj. 9993)
(AD-A104378; SCIENTIFIC-2; AFGL-TR-80-0371) Avail: NTIS HC A02/MF A01 CSCL 04/1

This report summarizes a procedure for two variable fitting of the equatorward boundary of electron precipitation. A least squares minimization approach is used. The SSJ/3 detector consists of a set of two curved plate electrostatic analyzers designed to measure the flux of precipitating electrons in the energy range from 50 eV to 20 KeV. The detectors are flown routinely on the satellites of the Defense Meteorological Satellite Program (DMSP). The data returned from the detectors have been used to conduct an extensive study of the systematics of the shape and motion of the equatorward boundary of auroral precipitation. The equatorward extent of auroral precipitation is a key boundary condition on the state of the Earth's magnetosphere. Each pass of the satellite over the auroral oval provides two boundary determinations. One technique for studying the boundary is to tag each pair of boundary determination with the magnetic local times in which they occur and to consider each pair of two crossings to have been made simultaneously. These pairs of points can then be separated into classes according to the magnetic local time zones associated with each boundary location. Since the orbit of the satellite is nearly sun synchronous the same pairs of magnetic local time zones are passed through each day such that the number of local time zone classes is limited. GRA

N82-11709# Bedford Research Associates, Mass.
DATA BASE SPECIFICATIONS FOR THE OPAQUE PROGRAM
E. Cronin (AFGL, Hanscom AFB) and H. Cohn 1 Jul. 1981 34 p
(Contract F19628-79-C-0163; AF Proj. 9993)
(AD-A104340; SCIENTIFIC-5; AFGL-TR-81-0057) Avail: NTIS HC A03/MF A01 CSCL 04/1

A complete and current identification of the data and its format as used in the OPAQUE research program is presented. OPAQUE is a measurement program on optical atmospheric quantities in Europe. The ultimate objective for the research program is to develop a data base of atmospheric optical and infrared (IR) parameters which affect military systems. GRA

N82-11710# SRI International Corp., Menlo Park, Calif.
ALTAIR RADAR STUDY OF EQUATORIAL SPREAD F Final Report, 11 Jan. 1979 - 30 Nov. 1980
Roland T. Tsunoda 1 Feb. 1981 54 p refs
(Contract DNA001-79-C-0153)
(AD-A104554; DNA-5689F) Avail: NTIS HC A04/MF A01 CSCL 04/1

The results of research on equatorial spread-F (ESF) phenomena obtained by using two backscatter radars, ALTAIR and TRADEX, are summarized. The radar measurements were made in support of three rocket campaigns conducted from the Kwajalein Atoll during the summers of 1977 through 1979. Backscatter data from ESF irregularities and incoherent-scatter (IS) data from thermal plasma fluctuations were used to show that the structuring of the equatorial F-region plasma is initiated by large-scale (tens to a few hundred kilometers in the east-west direction) plasma-density modulations in the bottomside F layer. The modulation, best described by wavelike altitude variations in constant electron-density contours, appears to be imposed on the bottomside F layer around E-region sunset by a yet-to--be-identified source (although atmospheric gravity waves are a likely candidate). The amplification of the wavelike modulation, in the form of upwellings from the crests of the modulation, is consistent with the amplification expected from the collisional Rayleigh-Taylor instability. Once the upwellings begin to grow in altitude extent, the west walls become unstable via the gradient-drift instability, driven by an eastward neutral wind blowing through the walls of the upwellings. The enhanced structuring of the west wall at low F-region altitudes is made possible by the presence of a velocity shear in eastward plasma drift. Author (GRA)

N82-11711# Analytic Sciences Corp., Reading, Mass.
MILITARY GEODESY AND GEOSPACE SCIENCE, UNIT THREE
Warren G. Heller and A. Richard LeSchack Feb. 1981 172 p refs
(Contract F19628-77-C-0152; AF Proj. 3204)
(AD-A105072; SCIENTIFIC-7; AFGL-TR-81-0030) Avail: NTIS HC A08/MF A01 CSCL 04/1

This lecture course provides a full-year introduction to Military Geodesy and Geospace Science. Throughout the presentation a military perspective is maintained which links Mapping, Charting, and Geodesy (MC&G) issues with modern defense requirements. Elementary preparation is assumed in the subjects of general physics, mechanics, chemistry, astronautics, and linear system theory. The student should also be familiar with differential equations, analytic geometry, and linear algebra. Some acquaintance with vector calculus is useful but not essential. The topics covered herein are intended to provide conceptual rather than working knowledge. Ideally, the student completing this course will have attained a broad understanding of the MC&G field and will be able to develop specialized expertise quickly when required. The organizational flow of the lectures is from concepts in the initial sections, particularly in Unit One, to applications and specific systems later on. As a result the student is often referred ahead to provide motivation in regard to relevancy. In later chapters, however, the situation is reversed with the student referred back to review important conceptual material as necessary. GRA

N82-11712# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER MODELS TO SUPPORT INVESTIGATIONS OF SURFACE SUBSIDENCE AND ASSOCIATED GROUND MOTION INDUCED BY UNDERGROUND COAL GASIFICATION
R. T. Langland and B. C. Trent (Science Applications, Inc., Steamboat Springs, Colo.) 1981 14 p refs Presented at the

7th Ann. Underground Coal Conversion Symp., Fallen Leaf Lake, Calif., 8-11 Sep. 1981
(Contract W-7405-eng-48)
(DE81-027131; UCRL-86437; CONF-810923-1) Avail: NTIS HC A02/MF A01

Two computer codes compare surface subsidence induced by underground coal gasification at Hoe Creek, Wyoming, and Centralia, Washington. Calculations with the STEALTH explicit finite-difference code are shown to match equivalent implicit finite-elemet method solutions or the removal of underground material. Effects of removing roof material, varying elastic constants, investigating thermal shrinkage, and burning multiple coal seams are studied. A coupled finite-difference continuum rigid-block caving code is used to model underground opening behavior. Numerical techniques agree qualitatively with empiricial studies but, so far, underpredict ground surface displacement. The two methods, numerical and empirical, are most effective when used together. It is recommended that the thermal characteristics of coal measure rock be investigated and that additional calculations be carried out to longer times so that cooling influences can be modeled. DOE

N82-11713# Sandia Labs., Albuquerque, N. Mex.
RECOVERY OF SEISMIC SIGNALS IN NOISE BY ADAPTIVE PROCESSING
Glenn R. Elliott 1981 9 p refs
(Contract DE-AC04-76DP-00789)
(DE81-029469; SAND-81-1079) Avail: NTIS HC A02/MF A01

Techniques are described for use in improving the signal-to-noise ratio of electrical signals buried in noise from seismic sensors. Often not enough information is available about the characteristics of either the signal or the noise to permit the use of more classical detection methods, i.e., matched filtering, likelihood detectors, array averaging, etc. Adaptive processing can be of benefit in these cases. Examples of work to improve performance of perimeter intrusion detection systems is presented. DOE

N82-11714# Sandia Labs., Albuquerque, N. Mex.
EVALUATION OF UNCERTAINTIES IN GEOLOGIC INFORMATION
J. T. Neal 1981 10 p refs Presented at the Symp. on Uncertainties Assoc. with the Regulation of the Geol. Disposal of High-Level Radioactive Waste, Gatlinburg, Tenn., 9 Mar. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025997; SAND-80-2690C; CONF-810372-5) Avail: NTIS HC A02/MF A01

Most geologic information is interpretive as opposed to factual; however, in either case conclusions commonly are derived from data having unequal reliability. Decisions can take such disparity into account by using information hierarchies, by incorporating more realism into mapping, and by more rigorous quantification of models and maps. Information hierarchies can rank direct measurement (from outcrops, boreholes, etc.) as having greater confidence than indirect measurement (from geophysics, etc.). Mapping realism can be enhanced by showing individual outcrops and by more precisely defining attributes of map units. Recognizing the evolving nature of geologic truth appears to undermine confidence, as does acknowledging the inherent subjectivity in our information base. On the other hand, facing and systematically treating uncertainty ultimately can lead to greater confidence in final decisions. DOE

N82-11715# Los Alamos Scientific Lab., N. Mex.
RELAXATION OF GEOTHERMAL-RESERVOIR STRESSES INDUCED BY HEAT PRODUCTION
H. Murphy, ed., R. Aamodt, H. Fisher, T. Grant, C. Grigsby, R. Hendron, H. Keppler, C. Pearson, R. Potter, and G. Suhr Aug. 1981 34 p refs
(Contract W-7405-eng-36)
(DE81-032024; LA-8954-MS) Avail: NTIS HC A03/MF A01

Fifteen million kWh of thermal energy were produced during 281 days of operation of the hot dry rock (HDR) geothermal reservoir at Fenton Hill, New Mexico. Following this heat production the thermal stresses and strains so were partially released by a shot, 7-h pressurization of the reservoir above the local tectonic confining stress. Following the partial stress release, it was found that the resistance to water flow through the reservoir was decreased by 37 percent, and that the reservoir volume, as measured by tracer studies, increased by 43 percent. Microseismic events recorded with geophones in two deep wells at positions within a few hundred meters of the reservoir were concentrated in those regions of the reservoir most affected by thermal depletion. These events define a reservoir region and size in qualitative agreement with estimates based upon heat production modeling. DOE

N82-11716# Geological Survey, Menlo Park, Calif.
PRINCIPAL FACTS, ACCURACIES, SOURCES, BASE STATION DESCRIPTIONS, AND PLOTS FOR 1380 GRAVITY STATIONS IN THE TONOPAH 1 DEG BY 2 DEG QUADRANGLE, NEVADA Final Report
R. W. Saltus, D. B. Snyder, and C. R. Karish 1981 89 p refs Prepared in cooperation with DOE, Las Vegas, Nev.
(PB81-219081; USGS/GD-81/004) Avail: NTIS HC A05/MF A01 CSCL 08E

Base station descriptions, location plots, and observed gravity base station values describe these staions. All the stations were reduced to complete Bouguer anomalis. Three sources provided original field measurements: the U.S. Geological Survey, Menlo Park; the Defense Mapping Agency/Topographic Center/Geodetic Survey Squadron; and the U.S. Geologica Survey, Denver. Each source is documented as to meters used, calibration, and field terrain correction method. GRA

N82-11717# Environmental Protection Agency, Las Vegas, Nev. Exposure Assessment Research Div.
GEOTHERMAL ENVIRONMENTAL ASSESSMENT BASELINE STUDY: VEGETATION AND SOILS OF THE ROOSEVELT HOT SPRINGS GEOTHERMAL RESOURCE AREA
K. W. Brown and G. B. Wiersma Jul. 1981 109 p refs
(PB81-223299; EPA-600/4-81-060) Avail: NTIS HC A06/MF A01 CSCL 08G

Identification and elemental concentrations of indigenous soil and plant systems found on the Roosevelt Hot Spring KGRA are described. Twenty-three different soils and five separate plant communities are geographically mapped and identified. One hundred forty-seven plant species were identified. Forbs, shrubs, and grasses are represented by 58, 53, and 36 species respectively. Three sites each measuring 25 hectares were selected for long-term vegetative assessment. At these locations a permanent enclosure measuring 24.4 meters x 24.4 meters was constructed to assess long-term effects livestock grazing. Biomass plant species, percentage composition, ground cover and livetock carrying capacities were determined at each site. Surface soils and Artemisia tridentata leaf tissue were collected for elemental analysis. GRA

N82-11718 Washington Univ., Seattle.
ADAPTATION OF LAND USE TO SURFICIAL GEOLOGY IN METROPOLITAN WASHINGTON, D.C. Ph.D. Thesis
Robert Houston Alexander 1981 236 p
Avail: Univ. Microfilms Order No. 8121177

Implicit in the investigation is a process of communicating geologic information, and incorporating such information into land-use decisions. Land-use data were derived from high-altitude color infrared aerial photography, and the information on geologic suitability was obtained from a U.S. Geological Survey map of landforms and surface materials compiled to aid non-geologists in land use planning decisions. The new map was further interpreted and subdivided into those areas geologically suitable and unsuitable for residential and agricultural uses, respectively. The study found significant relationships among land uses and geologic map units, and significant differences in land-use and geologic suitability regimes in subregions based on distance from city center. More recently-developed areas near the urban core have higher proportional associations of residential and agricultural land use with appropriate surficial geologic characteristics than do the outlying areas on the metropolitan fringe. Dissert. Abstr.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-11719 Cornell Univ., Ithaca, N. Y.
A NUMERICAL DYNAMICAL INVESTIGATION OF THE ROLE OF SUBSYNOPTIC INERTIAL AN ISALLOBARIC ADJUSTMENTS IN ORGANIZING SEVERE LOCAL STORM ENSEMBLES Ph.D. Thesis
John William Zack 1981 330 p
Avail: Univ. Microfilms Order No. 8119543

The physical components of the severe local convection storm environment are compiled from previous investigators. It is summarized that significant convection is favored when upward vertical motion occurs in an atmosphere which has a high degree of potential hydrostatic instability. In addition, the severest storms, such as tornadoes, are favored when there is a large degree of vertical wind shear and a significant low level temperature inversion exists prior to convection storm formation. Dissert. Abstr.

N82-11720 Iowa State Univ. of Science and Technology, Ames.
THE 4-DAY TEMPERATURE WAVE IN THE WINTER POLAR STRATOSPHERE Ph.D. Thesis
David Eugene Venne 1981 135 p
Avail: Univ. Microfilms Order No. 8122571

Additional observational evidence is presented which suggests that the wave represents a normal mode oscillation of the atmosphere. A polar-plane approximation to the earth's sphericity at high latitudes is described and applied to the equations of air parcel motion, yielding solutions the zonal mean wind is taken to be in solid rotation with no vertical shear, conditions which are typical in the region of largest 4-day wave amplitudes. The substantial changes in the mean zonal wind caused by stratospheric sudden warmings are shown to modify the 4-day wave. Dissert. Abstr.

N82-11721 Pennsylvania State Univ., University Park.
FRONTOGENESIS IN THE PLANETARY BOUNDARY LAYER OF AN AMPLIFYING, TWO-DIMENSIONAL BAROCLINIC WAVE Ph.D. Thesis
Daniel Keyser 1981 314 p
Avail: Univ. Microfilms Order No. 8120445

In order to explore the hypothesis that the absence of fine structure is related to the neglect of nonconservative processes such as the vertical turbulent transports by heat and momentum in the planetary boundary layer (PBL), a series of analytic and numerical experiments with the Hoskins-Bretherton horizontal shear model of frontogenesis in an amplifying, two dimensional baroclinic was were performed. The results of this investigation suggest two hypotheses: the first relates the orientation of cloud bands associated with low-level frontal zones to the frontogenetical mechanisms of horizontal shear and confluence. The second is concerned with explaining the structure and evolution of several atmospheric circulation systems in terms of adjustment processes toward equilibrium configurations between the mass and wind fields. Dissert. Abstr.

N82-11722 Washington Univ., Seattle.
NUMERICAL SIMULATION OF THE DYNAMICS, CLOUD MICROPHYSICS AND RADAR ECHO STRUCTURES OF TROPICAL AND MID-LATITUDE CONVECTION Ph.D. Thesis
Chee Pong Cheng 1981 229 p
Avail: Univ. Microfilms Order No. 8121187

Tropical convective cells have radar echo patterns that are distinctly different from many mid-latitude convective cells. Also, tropical convection develops associated regions of rain falling from thick anvil clouds. This anvil rain is stratiform and its radar reflectivity pattern contrasts sharply with the adar echoes of the cells. Numerical modeling is used to achieve a better understanding of the dynamical-microphysical interactions that result in the radar echo patterns of tropical and mid-latitude convective cells and of tropical anvil precipitation. Dissert. Abstr.

N82-11723*# Michigan Univ., Ann Arbor.
TIME-VARIABLE EARTH'S ALBEDO MODEL CHARACTERISTICS AND APPLICATIONS TO SATELLITE SAMPLING ERRORS Final Report
Fred L. Bartman Sep. 1981 78 p refs
(Grant NAG1-67)
(NASA-CR-165781; Rept-0189219-1-F) Avail: NTIS HC A05/MF A01 CSCL 04B

Characteristics of the time variable Earth albedo model are described. With the cloud cover mulitplying factor adjusted to produce a global annual average albedo of 30.3, the global annual average cloud cover is 45.5 percent. Global annual average sunlit cloud cover is 48.5 percent; nighttime cloud cover is 42.7 percent. Month-to-month global average albedo is almost sinusoidal with maxima in June and December and minima in April and October. Month-to-month variation of sunlit cloud cover is similar, but not in all details. The diurnal variation of global albedo is greatest from November to March; the corresponding variation of sunlit cloud cover is greatest from May to October. Annual average zonal albedos and monthly average zonal albedos are in good agreement with satellite-measured values, with notable differences in the polar regions in some months and at 15 S. The albedo of some 10 deg by 10 deg. areas of the Earth versus zenith angle are described. Satellite albedo measurement sampling effects are described in local time and in Greenwich mean time. Author

N82-11724*# Howard Univ., Washington, D. C. Dept. of Mathematics.
SOME ANALYSIS ON THE DIURNAL VARIATION OF RAINFALL OVER THE ATLANTIC OCEAN
Tepper Gill, Shien Perng, and Arthur Hughes Aug. 1981 55 p refs
(Grant NsG-5295)
(NASA-CR-164937) Avail: NTIS HC A04/MF A01 CSCL 04B

Data collected from the GARP Atlantic Tropical Experiment (GATE) was examined. The data were collected from 10,000 grid points arranged as a 100 x 100 array; each grid covered a 4 square km area. The amount of rainfall was measured every 15 minutes during the experiment periods using c-band radars. Two types of analyses were performed on the data: analysis of diurnal variation was done on each of grid points based on the rainfall averages at noon and at midnight, and time series analysis on selected grid points based on the hourly averages of rainfall. Since there are no known distribution model which best describes the rainfall amount, nonparametric methods were used to examine the diurnal variation. Kolmogorov-Smirnov test was used to test if the rainfalls at noon and at midnight have the same statistical distribution. Wilcoxon signed-rank test was used to test if the noon rainfall is heavier than, equal to, or lighter than the midnight rainfall. These tests were done on each of the 10,000 grid points at which the data are available. T.M.

N82-11725*# National Aeronautics and Space Administration, Washington, D. C.
EVALUATION OF PHOTOGRAMMETRIC FLIGHT UNDER ICING CONDITIONS ON MARCH 23, 1978
Werner Fuchs and Josef Kaluza Sep. 1981 43 p refs Transl. into ENGLISH of Ber. fuer den Geophysikalischen Beratungsdienst der Bundeswehr, Traben-Trarbach (West Germany), no. 28, 1980 p 1-50 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76617) Avail: NTIS HC A03/MF A01 CSCL 04B

In a double passage through a route laid out in a stagnation zone of the Bavarian forest, it was found that the stagnation and attendant elevation increases the danger of icing. Conversely, it turned out that formation of precipitation reduces the icing intensity. A comparison of both factors showed: the reduction of ice formation through precipitation equals the increase due to stagnation, or even exceeds it. T.M.

N82-11726# Air Force Geophysics Lab., Hanscom AFB, Mass.
AN ASSESSMENT OF DETECTING MESOSCALE RAINFALL FROM MID-LATITUDE CYCLONES USING GOES IMAGERY DATA Interim Scientific Report

Ronald F. Fournier 25 Mar. 1981 40 p refs
(AF Proj. 6670)
(AD-A104377; AFGL-TR-81-0089; AFGL-ERP-735) Avail: NTIS HC A03/MF A01 CSCL 04/2

This study examined the capability of current geostationary satellite sensors in resolving and monitoring important mesoscale rain areas. Shallow mesoscale precipitation patterns were analyzed with radar and recording rain gage data associated with mid-latitude cyclones in New England. These cyclones were characterized by relatively little stratiform cloudiness in the upper troposphere. Radar thresholding was used to determine the spatial and temporal scales of small mesoscale areas (SMSAs), large mesoscale areas (LMSAs), and major echoes. Radar rainfall estimates were used to determine the relative amount of rainfall contributed by the mesoscale features. Radar analysis of the three cases showed that the spatial scale of major echoes, LMSAs, and SMSAs were large enough for detection by GOES sensors. Major echoes and the LMSAs contained within them were found to have lifetimes that are long relative to the half-hour interval between GOES transmissions. The duration of some SMSAs and all cells, however, was on the same order as the time interval between GOES transmissions. In addition, radar rainfall estimates showed that the major echoes, LMSAs, and SMSAs were the major contributors to mesoscale rainfall. For the cases examined in this study, GOES sensors were not capable of distinguishing the individual mesoscale precipitation areas detected by radar. Therefore, GOES sensors do not appear adequate for developing satellite rainfall estimation techniques to specify shallow mesoscale precipitation. GRA

N82-11727# Naval Postgraduate School, Monterey, Calif.
RELATIONSHIPS BETWEEN SYNOPTIC STORM ACTIVITY AND SEA SURFACE TEMPERATURE ANOMALIES OVER THE NORTH PACIFIC OCEAN M.S. Thesis
Bauke H. Houtman Jun. 1981 83 p refs
(AD-A104590) Avail: NTIS HC A05/MF A01 CSCL 04/2

The significance of year-round relationships between synoptic storm activity and sea-surface temperature (SST) over the North Pacific Ocean for the period January 1969 through December 1978, were examined using cross-correlation analysis. The possible existence of a seasonal dependence in the SST-wind relationships was examined using sub-sample record cross-correlation analysis and model tests with both a constant and a variable mixed-layer depth, respectively. Wind forcing data was represented by (U-3*), friction velocity cubed, and wind stress curl (CURL sub Z tau), as computed from: (a) High-pass filtered wind components only (periods less than ten days), (b) High- and Low-pass filtered wind components which includes the interaction terms and (c) the unfiltered (total) wind components. GRA

N82-11728# Naval Postgraduate School, Monterey, Calif.
TROPICAL STORM MOVEMENT BASED ON SYNOPTIC MAP TYPING USING EMPIRICAL ORTHOGONAL FUNCTIONS M.S. Thesis
Danley W. Brown Jun. 1981 81 p refs
(AD-A104591) Avail: NTIS HC A05/MF A01 CSCL 04/2

This initial study investigates the feasibility of using weather map types to forecast tropical storm/typhoon movement in the Western North Pacific Ocean. Fleet Numerical Oceanographic Center's hemispheric D-value analysis fields at 850, 700 and 500 mb are interpolated to a standard grid oriented relative to the present surface tropical storm position. Empirical Orthogonal Function (EOF) analysis is used to represent the fields in terms of only 10 coefficients in an effort to separate true synoptic map features from random noise. A least squares approach is then applied to determine characteristic synoptic patterns relative to the tropical storm, and to relate each individual cast to a 'map type'. An analog type approach is used to forecast the 30-, 36-, 54-, 60-, 78- and 84-hour positions. All storms determined to be of the same map type as the candidate storm were considered to be analogs, and their storm tracks were rotated to have the same past 12-hour movement. Forecast errors ranged from 135 n.mi. at 30 hours to 490 n.mi. at 84 hours. Although no independent cases were tested, and the techniques employed have not been optimized, the mean vector errors indicate that the basic technique warrants further investigation. Author (GRA)

N82-11729# Naval Postgraduate School, Monterey, Calif. Dept. of Oceanography.
AN OPEN-OCEAN MARINE FOG DEVELOPMENT AND FORECAST MODEL FOR OCEAN WEATHER STATION PAPA M.S. Thesis
Robert Louis Clark Jun. 1981 131 p refs
(AD-A104595; NPS68-81-005) Avail: NTIS HC A07/MF A01 CSCL 04/2

Marine fog forecasts during the summer period in the North Pacific are not made presently with any acceptable degree of accuracy. Objective fog development models exist and are used with some success for localized coastal regions of the western U.S.; scarcity of accurate data has hindered creation of a reliable open-ocean model. The Eulerian single-station approach, utilizing a segment of the complete accurate data of Ocean Weather Station Papa (50N, 145W) is applied in this study to an objective marine fog forecasting model. The time-series study of significant atmospheric variables at OWS Papa, when coupled with a chronological synoptic overview, delineates accurately fog/no fog sequences in the summer months of 1973 and 1977. Actual observed fog situations are evaluated by the general model and presented in relation to open-ocean fog indices, NOAA 5 satellite coverage and synoptic history. The open-ocean forecast model is tested on an independent data set for the month of July 1975 at OWS Papa, with favorable results. The research delineates four required indices that must all be positive to forecast fog. These indices, when plotted daily in the region of OWS Papa allow a single station to predict, with some confidence out to twenty-four hours, the occurrence of advection fog. Author (GRA)

N82-11730# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
ESTIMATES FOR THE PROBABILITIES OF SURFACE-TO-AIR CLOUD-FREE LINES-OF-SIGHT AND LOW CLOUD STATISTICS FROM SHIP OBSERVATIONS. PART 1: FIFTEEN MARINE LOCATIONS Progress Report, 1964 - 1971
B. S. Katz, F. C. DeBold, and J. J. Perez-Esandi 24 Nov. 1980 169 p refs
(ZF59551002)
(AD-A104633; NSWC/TR-78-143) Avail: NTIS HC A08/MF A01 CSCL 04/2

Estimates of the probability of cloud-free lines of sight (PCFLOS) were calculated for a set of nine angles using a modification of Lund and Shanklin's universal method from lower cloud weather data taken at fifteen marine locations. The data compilation covers periods from five to seven years (1964-1971) and provides statistics for seasonal variations of lower cloud base heights and cover and low cloud type and cover. Both the seasonal weather data (winter, spring, and summer) and the PCFLOS are tabulated for each location for nine different elevation angles from 10 to 90 degrees above the horizontal and for the heights for which lower cloud base data were available. The main assumption of the unmodified method, which is fully described in the text, is that the universal method can be applied successfully to the statistics for individual low cloud base height recording cells. Intermediate computational results corresponding to base height cells and the values of PCFLOS through all clouds, calculated by the unmodified method. Data from four selected locations were plotted for illustration and comparison purposes. PCFLOS statistics for various angles and cloud base heights were related to ability to visually detect targets at various ranges, altitudes, and elevation angles, by means of graphs that precalculated the slant range. A summary of the weather statistics and PCFLOS for all stations is also included. Author (GRA)

N82-11731# Massachusetts Inst. of Tech., Cambridge.
OCEANS AND OCEAN CURRENTS: THEIR INFLUENCE ON CLIMATE
Reginald E. Newell, Long S. Chiu, Wesley Ebisuzaki, Alfredo Navato, and Henry B. Selkirk 1980 56 p refs Presented at the Conf. on Climate and Offshore Energy Resources, London, 21 Oct. 1980 Sponsored in part by the National Science Foundation, Washington, D.C.
(Contract DE-AS02-76EV-12195)
(DE81-027263; DOE/EV-12195/41; CONF-8010198-2) Avail: NTIS HC A04/MF A01

Particular attention is given to influences that may be related to offshore energy generation. The role of the ocean currents and seasonal, as well as nonseasonal variations, are discussed. The effects of the Southern Oscillation, a non-seasonal signal in the climate system second only to the Ice Ages, are emphasized. T.M.

N82-11732# National Center for Atmospheric Research, Boulder, Colo.

AN ANALYSIS OF CLOUD PROPERTY RETRIEVAL USING INFRARED SOUNDER DATA Ph.D. Thesis - California Univ.

Bruce A. Wielicki 1980 139 p refs
(Grant NSF ATM-77-23757)
(PB81-221608; NCAR-CT-61) Avail: NTIS HC A07/MF A01 CSCL 04A

The cloud properties considered are effective cloud amount (emissivity times cloud fractional coverage in the satellite field of view), cloud top pressure, and the ratio of cloud emissivities in different spectral regions of the infrared. The cloud amount errors and cloud top pressure errors caused by instrument noise and by uncertainties in estimated clear-sky radiances due to temp. profile and water vapor profile uncertainties were examined. The retrieval errors appropriated for a cloud climatology of average cloud amount within 1 km cloud height intervals were studied. GRA

N82-11733# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Labs.

THE WIND CLIMATOLOGY OF AMERICAN SAMOA

John C. Bortniak (Geophysical Monitoring for Climatic Change) Mar. 1981 72 p refs
(PB81-221012; NOAA-TM-ERL-ARL-98; NOAA-81050611) Avail: NTIS HC A04/MF A01 CSCL 04B

From an investigation of the tropical Pacific winds using previous work done in this area, three major sources of Samoa air were identified. The easterly trade winds are the most frequent source, and southerly air from the east of Australia occurs a large percentage of the time. The third source, occurring only a few percent of the time in the austral summer, is direct Northern Hemisphere air, which is normally blocked by the intertropical Convergence Zone. General features of tropical Pacific winds are also discussed. GRA

N82-11734# Geological Survey, Lakewood, Colo. Water Resources Div.

VARIATIONS IN CLIMATIC CHARACTERISTICS AS RELATED TO EVAPOTRANSPIRATION IN SOUTH PARK, CENTRAL PARK COUNTY, COLORADO Final Report

Norman E. Spahr 1981 161 p refs Prepared in cooperation with City of Denver
(PB81-219610; USGS/WRI-80-86; USGS/WRD/WRI/81-047) Avail: NTIS HC A08/MF A01 CSCL 04B

Data collected during May through September in 1977, 1978, and 1979 at three stations were analyzed using an analysis of variance technique to determine variations in climatic characteristics in South Park. Knowledge of these climatic characteristics will aid in determining the amount of water that may be transferred from agricultural use in South Park to municipal use in the Denver metropolitan area. Daily minimum air temperature, daily average air temperature, cumulative wind, daily relative humidity, and daily solar radiation were statistically different between the three stations at the 1-percent level of significance. Daily maximum air temperature and daily pan evaporation were not significantly different between the three stations. GRA

N82-11735# National Weather Service, Washington, D.C. Climate Analysis Center.

CLIMATE DIAGNOSTICS WORKSHOP (5TH) ANNUAL PROCEEDINGS

Jay S. Winston, ed. Mar. 1981 402 p refs Proceedings of Conf. held at Seattle, 22-24 Oct. 1980
(PB81-222200; NOAA-81050604) Avail: NTIS HC A18/MF A01 CSCL 04B

The past year's climate fluctuations were reviewed. General studies of variations in the large scale circulation are presented. Data and methods for monitoring snow and ice, water vapor, and volcanic aerosols are discussed. Large scale sea-air interactions are reported with emphasis on the equatorial Pacific, Southern Oscillation, El Nino, and related phenomena. T.M.

N82-11736# National Center for Atmospheric Research, Boulder, Colo.

US MONSOON EXPERIMENT MONEX RAWINSONDE/ RADIOMETERSONDE SYSTEM

Gerald A. Meehl, Robert B. McBeth, William C. Bolhofer, and Sushil Unninayar Nov. 1980 54 p refs
(Grant NSF ATM-77-23757)
(PB81-222937; NCAR/TN-164+EDD) Avail: NTIS HC A04/MF A01 CSCL 04B

A procedure to convert rawinsonde and radiometersonde observations from raw data into the standard message format in the field with the use of two inexpensive programmable calculators and a miniaturized wind-plotting board is described. The combination of elements of an automatic processing system concept and aspects of the more conventional graphical analysis method makes the system economical, portable, and easy to operate by supporting personnel with a minimum of training, especially in locations with difficult logistical requirements. This method was developed for use with portable rawinsonde and radiometersonde systems at remote field sites in Southeast Asia and Nepal in support of the upper air observational program of the International Monsoon Experiment (MONEX). GRA

N82-11737# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.

THE ESTIMATION OF CONVECTIVE, SUMMERTIME RAINFALL IN THE UNITED STATES HIGH PLAINS FROM THERMAL INFRARED, GEOSTATIONARY SATELLITE IMAGERY, VOLUME 1 Final Report, Oct. 1977 - Dec. 1979

Cecilia G. Griffith, William L. Woodley, and John A. Augustine Oct. 1980 172 p refs 2 Vol.:
(Contract DI-8-07-83-V0016)
(PB81-222762) Avail: NTIS HC A08/MF A01 CSCL 04B

Estimates of summertime, convective rainfall for 15 cases over three United States High Plains sites have been computed from geosynchronous, thermal infrared imagery. The satellite technique (derived in south Florida) overestimated High Plains rainfalls by a factor of approximately 5 (that is, approximately 500 percent difference). Three modifications to the technique to account for environmental differences were tested. GRA

N82-11738# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.

THE ESTIMATION OF CONVECTIVE, SUMMERTIME RAINFALL IN THE UNITED STATES HIGH PLAINS FROM THERMAL INFRARED, GEOSTATIONARY SATELLITE IMAGERY, VOLUME 2 Final Report, Oct. 1977 - Dec. 1979

Cecilia G. Griffith, William L. Woodley, and John A. Augustine Oct. 1980 79 p refs 2 Vol.
(Contract DI-8-07-83-V0016)
(PB81-222770) Avail: NTIS HC A05/MF A01 CSCL 04B

A series of four computer programs which analyze digital geostationary satellite data for convective rainfall estimation are described. The programs: (1) navigate, (2) isolate and track clouds, (3) compute rainfall per cloud and (4) map the inferred rainfall. GRA

N82-11739# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Technoloy Div.

THE MEASUREMENT OF HEIGHT AND SLOPE OF ISOBARIC SURFACES WITH AN AIRBORNE RADAR ALTIMETER

E. N. Brown, C. A. Friehe, M. A. Shapiro, and P. J. Kennedy Dec. 1980 22 p refs
(Grant NSF ATM-77-23757)
(PB81-221632; NCAR/TN-160) Avail: NTIS HC A02/MF A01 CSCL 04B

The aeronautical use of electronic altimeters is to measure the absolute clearance of an aircraft above the Earth's surface. In support of atmospheric research, accurate high-range altimeters, in conjunction with accurate static pressure and navigation data can also provide a means for measuring the heights of constant-pressure surfaces. From the derivatives of the measurements,

surface slopes and dynamical quantities such as the geostrophic wind may be obtained. The operational and research use of a high pulse-type radar altimeter system installed on the NCAB Sabreliner for jet stream research is described. GRA

N82-11740# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
INSTRUMENT INTERCOMPARISONS AT THE BOULDER ATMOSPHERIC OBSERVATORY DURING 1980
J. E. Gaynor and J. A. Korrell Mar. 1981 45 p refs
(PB81-220139; NOAA-TM-ERL-WPL-69; NOAA-81050610)
Avail: NTIS HC A03/MF A01 CSCL 04B

The three-axis Doppler bistatic sodar discussed in this report was a redesign of the system used in the BLIE. The tethersonde, essentially identical with that used in the BLIE, provided averages of about 5 min at nearly fixed levels corresponding to the BAO tower levels. Similar averages for the tower data were used for comparisons. The monostatic Doppler sodar also discussed in this report, was not previously tested at the BAO. The testing procedures followed those used in the BLIE, and the results from the three instruments are presented in similar format to the BLIE report, but in more detail. Added to the results is a brief discussion of the capabilities of a Doppler sodar in measuring vertical wind speed standard deviation using a limited set of data. GRA

N82-11741# Pennsylvania State Univ., University Park. Dept. of Meteorology.
NUMERICAL STUDIES OF HURRICANE-OCEAN INTERACTIONS Final Report
Richard A. Anthes Apr. 1981 54 p refs
(Grant NOAA-04-4-022-26)
(PB81-225575; NOAA-81050810) Avail: NTIS HC A04/MF A01 CSCL 04B

An axisymmetric, interacting model of the ocean and the atmosphere was developed to study the mutual response of the tropical cyclone and the ocean. The hurricane model with the high-resolution PBL model was coupled with an axisymmetric version of the mixed-layer ocean model. The combined model was integrated simultaneously for 24 h to investigate the mutual response of the two systems. The results suggest that appreciable weakening of a hurricane due to the cooling of the oceanic surface will not occur if it is translating at typical speed. GRA

N82-11742# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
DOPPLER RADAR DATA ANALYSIS DURING FISCAL YEAR 1980 Final Report
W. R. Moninger, R. Dineen, and T. Becker Mar. 1981 46 p refs
(PB81-225476; NOAA-TM-ERL-WPL-70; NOAA-81051409)
Avail: NTIS HC A03/MF A01 CSCL 04B

Two triple Doppler radar case studies are discussed. The first is of a post frontal band observed as it moved up the foothills of the Sierra Nevada mountains. The band structure was primarily helical, with inflow from the right front of the band at low levels, an updraft slightly behind the reflectivity core of the band, and outflow toward the left front. The band structure was similar to but smaller in scale than bands observed in the Sacramento valley. The second case is of a weak frontal passage followed by a strong squall line passage. The squall was intense enough to have an associated tornado, but was quite shallow. Reflectivity in the squall line was a maximum of 52 dBZ at 0.6 km msl, dropping to below 20 dBZ above 5.1 km msl. GRA

N82-11743# National Oceanic and Atmospheric Administration, Miami, Fla.
THE DETERMINATION OF NAVIGATIONAL AND METEOROLOGICAL VARIABLES MEASURED BY NOAA/RFC WP3D AIRCRAFT
Francis J. Merceret and Harlan W. Davis Apr. 1981 28 p refs
(PB81-225468; NOAA-TM-ERL-RFC-7; NOAA-81051503)
Avail: NTIS HC A03/MF A01 CSCL 04B

For each variable, the sensor inputs and equations used are described and an estimate of the error in the result is provided. The report is divided into two sections: quantities displayed on-board in real-time and additional quantities computed and available to the user on request in the final data set. The aircraft and much of the instrumentation are described. T.M.

N82-11744# National Geodetic Survey, Rockville, Md.
A MODEL OF TEMPERATURE STRATIFICATION FOR CORRECTION OF LEVELING REFRACTION
Sandford R. Holdahl Apr. 1981 35 p refs
(PB81-225435; NOAA-TM-NOS-NGS-31; NOAA-81051111)
Avail: NTIS HC A03/MF A01 CSCL 04B

Refraction causes leveled height differences to be too small. It is usually considered to be the largest known systematic error in leveling measurements amounting to as much as a cm/km. In 1937, long before refraction was widely accepted as a significant error source, a correction was developed. Few countries adopted the correction, but it is now realized that the correction is necessary, especially in the middle and lower latitudes. Removing refraction bias from old leveling measurements requires a temperature stratification model. The model described is based on historical records of solar radiation, sky cover, precipitation, and ground albedo from many locations in the conterminous United States. This modeling method can be adopted by any country with records of solar radiation. GRA

N82-11745# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environment Lab.
COMPARISON OF OCEAN AND ISLAND RAINFALL IN THE TROPICAL SOUTH PACIFIC, ATLANTIC, AND INDIAN OCEANS
Cathleen Wright and R. K. Reed Apr. 1981 22 p refs
(PB81-225401; NOAA-TM-ERL-PMEL-25; NOAA-81051504)
Avail: NTIS HC A02/MF A01 CSCL 04B

Mean annual rainfall and maximum elevation were compiled from a variety of sources. Estimated annual ocean rainfall in the vicinity of each island was taken from a map of annual precipitation over the world ocean. Island rainfall was compared with ocean rainfall, and these island/ocean rainfall ratios were examined in terms of ocean location and island elevation. GRA

N82-11746# National Weather Service, Salt Lake City, Utah.
A COMPARISON OF TWO METHODS FOR FORECASTING THUNDERSTORMS AT LUKE AIR FORCE BASE, ARIZONA
Keith R. Cooley (Luke AFB, Ariz.) Apr. 1981 17 p refs
(PB81-225393; NOAA-TM-NWS-WR-163; NOAA-81051402)
Avail: NTIS HC A02/MF A01 CSCL 04B

A summary is presented of two studies for forecasting the occurrence of air-mass thunderstorms for the period 1 June through 30 September. The first is based on twelve years of upper-air data from Tucson and is referred to as the RAOB study. The second is based on three years of trajectory model data and is called the Trajectory study. At the present time the RAOB method does provide the forecaster an aid to forecasting thunderstorm activity at Luke Air Force Base, and is especially helpful to new forecasters assigned to the base. GRA

N82-11747# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
HAWAII MESOSCALE ENERGY AND CLIMATE PROJECT (HAMEC). 2: P-3 AIRCRAFT DATA SETS
M. A. Dias, comp., I. G. Nolt, comp., E. C. Nickerson, comp., and D. C. Welsh, comp. Mar. 1981 327 p refs
(PB81-224198; NOAA-81051408) Avail: NTIS HC A15/MF A01 CSCL 04B

Four types of in-flight meteorological data were recorded by research systems aboard the NOAA P-3 aircraft. They are: research aircraft measurements system (RAMS), a HP 2100 based computerized data system which records approximately seventy aircraft and meteorological variables on digital tape; omega dropwindsonde soundings (ODW); cloud data from aircraft cameras; and particle measuring systems (PMS) particle size data. GRA

N82-11748# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Labs.
WORKBOOK FOR ESTIMATING THE CLIMATOLOGY OF REGIONAL CONTINENTAL SCALE ATMOSPHERIC DISPERSION AND DEPOSITION OVER THE UNITED STATES

Roland R. Draxler and Jerome L. Heffter Feb. 1981 210 p refs Sponsored by DOE
(PB81-224172; NOAA-TM-ERL-ARL-96; NOAA-81042704) Avail: NTIS HC A10/MF A01 CSCL 04B

A version of the Air Resource Laboratories' (ARL) regional trajectory model was developed to permit simultaneous calculation of trajectories from 70 hypothetical sources of very long periods. Five years of data were used to develop a climatology of atmospheric dispersion. Air concentrations were calculated at receptors coincident with the 70 source locations. Each source and receptor was treated independently to develop a source/receptor matrix that can be used to produce air concentration patterns over the U.S. for any combination of sources or to evaluate the impact of different sources on any receptor. Five-year averages of seasonal and annual air concentrations are given for various combinations of wet and dry deposition. Example calculations are shown. GRA

N82-11749# National Weather Service, Silver Spring, Md.
EQUIPMENT FOR FLOOD AND FLASH FLOOD WARNING SYSTEMS
1981 416 p refs Sponsored in part by Army Prepared in cooperation with Arizona Dept. of Water Resources, Phoenix
(PB81-224131; NOAA-81042801) Avail: NTIS HC A18/MF A01 CSCL 04B

Entries in the publication are primary components from which an equipment system can be assembled. The National Weather Service plans to encourage to development of integrated equipment for various purposes. GRA

N82-11750# Intermountain Forest and Range Experiment Station, Ogden, Utah.
PRECIPITATION CHARACTERISTICS OF SUMMER STORMS AT STRAIGHT CANYON BAROMETER, WATERSHED, UTAH
Joel E. Fletcher, A. Leon Huber, Eugene E. Farmer, Keith R. McLaughlin, John Rector, and Larry J. Schmidt May 1981 15 p refs
(PB81-223950; FSRP/INT-274) Avail: NTIS HC A02/MF A01 CSCL 04B

Straight Canyon barometer watershed was divided into three similar precipitation intensity zones. The 50-year precipitation intensity (2-minute duration) increased from about 4 in per hour on zone 1, to about 13 in per hour on zone 3. Daily precipitation depths were revised, with zone 3 receiving 91.97 in and zone 1, 2.08 in. Rainfall erosivity increased from 12.5 hundreds of foot tons per acre-inch in zone 3. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-11751# New Hampshire Univ., Durham. Ocean Process Analysis Lab.
CONDITIONAL SAMPLING OF OCEANIC TEMPERATURE AND PRESSURE
James D. Irish, Wendell S. Brown, and Mark P. Woodbury 29 Jun. 1981 48 p
(Contract N00014-80-C-0351; Grant NSF OCE-78-26229)
(AD-A104539; TR-8101; UNH-SG-172) Avail: NTIS HC A03/MF A01 CSCL 08/1

In the ocean, as in the atmosphere, energy transfer processes exhibit a distinct intermittency. Important energy transfer events occur rarely in space and time but their contribution is likely to be greater than those from all others combined. For example, the most severe storms during a particular year are likely to be associated with a larger momentum and heat flux between the atmosphere and the ocean than the winds during the rest of the year. The breaking of an internal wave can lead to a greater vertical mixing of heat and salt than other diffusion processes. The presence of intermittency places severe demands on geophysical data acquisition. Routine sampling at fixed rates provide redundant data nearly all of the time and inadequate data during the rare times of an interesting event. A fixed program of intermittent rapid sampling superimposed on a standard low sampling rate (commonly referred to as burst sampling) is an improvement, but is not entirely satisfactory either. What is needed is a high rate of sampling conditioned by the occurrence of the rare important events or what will be referred here as conditional sampling. GRA

N82-11752# University of Southern California, Los Angeles. Dept. of Civil Engineering.
WAVE PROPAGATION OVER RECTANGULAR TRENCH
J. J. Lee and R. M. Ayer Dec. 1980 17 p refs
(Grant NSF ENV-77-01599)
(PB81-220782; NSF/RA-800544) Avail: NTIS HC A02/MF A01 CSCL 08C

Two dimensional, linearized potential flow was assumed. The fluid domain was divided into two regions along the mouth of the trench. Solutions in each region are expressed in terms of the unknown normal derivative of the potential function along this common boundary with the final solution obtained by matching. Reflection and transmission coefficients were found for various submarine geometries. The result shows that for a particular flow configuration, there exists an infinite number of discrete wave frequencies at which waves are completely transmitted. The validity of the solution in the infinite constant water depth region is shown by comparing with the results using a boundary integral method for given velocity distributions along the mouth of the trench. GRA

N82-11753# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
INDEX TO OBSERVATIONS OF CURRENTS IN PUGET SOUND, WASHINGTON, FROM 1908-1980
Jeffrey M. Cox, Curtis C. Ebbesmeyer, Carol A. Coomes, Laurence R. Hinchey, Jonathan M. Helseth, Glenn A. Cannon, and Clifford A. Barnes (Washington Univ., Seattle) Mar. 1981 62 p refs Prepared in cooperation with Evans-Hamilton, Inc.
(PB81-224115; NOAA-TM-OMPA-5; NOAA-81042703) Avail: NTIS HC A04/MF A01 CSCL 08C

In order to describe the characteristics of the circulation in two major basins of Puget Sound, Washington, a synthesis of historical current measurements are being undertaken. Nearly all the current observations taken throughout the Sound were collected. This report indexes 48.8 recorded years of Eulerian current observations generally one day or longer taken at nearly 300 sites from 1908-1980. The three major organizations taking measurements during this period were the National Ocean Survey, the University of Washington, and the Pacific Marine Environmental Laboratory. GRA

N82-11754# Washington Univ., Seattle. Div. of Marine Resources.
ON THE COMPUTATION OF BAROTROPIC TIDES IN DEEP ESTUARIES WITH APPLICATION TO KNIGHT INLET, BRITISH COLUMBIA
Bruno M. Jamart Oct. 1980 75 p refs
(Grant NA79AA-D-00054)
(PB81-220147; WSG-80-6; NOAA-81042910) Avail: NTIS HC A04/MF A01 CSCL 08C

Tidal motion in semi-enclosed basins is essentially periodic. Hence, the solution of the shallow water wave equations in Fourier space (or in terms of harmonic constituents) can be efficient alternative to the conventional time-stepping procedures. A numerical method based on that premise is described; the method combines variational calculus, an iterative scheme, and the finite element method to determine the spatial variations of the Fourier coefficients of water height and depth-averaged horizontal velocities. Computer results for the semidiurnal barotropic tidal flow agree fairly well with all available observations. GRA

N82-11755 Washington Univ., Seattle.
TIME DEPENDENT MIXING IN A SALT WEDGE ESTUARY Ph.D. Thesis
Eric Newell Partch 1981 181 p
Avail: Univ. Microfilms Order No. 8121232

Measurements of the profiles of salinity and velocity at anchored stations in the Duwamish River estuary at both high and low river stages indicate that the turbulent mixing through the density interface is highly time dependent with the most

intense mixing occurring at the maximum current speed during the ebb. Additional measurements of the turbulent kinetic energy and the turbulent flux of salt by the eddy correlation technique during low river discharge verify the interpretation. A lateral sampling experiment found that the intense mixing was concentrated in the center of the channel away from the flow boundaries. Echograms visualizing the interface showed it to be disturbed by waves with wavelengths of O(10m) and heights of O(1m) near maximum ebb. The interface was examined visually and found to be a thin(20-30cm) layer coinciding with a sharp thermocline. Dissert. Abstr.

N82-11756 Washington Univ., Seattle.
AN INVERSE TECHNIQUE FOR DETERMINATION OF MEAN OCEAN CIRCULATION Ph.D. Thesis
Karl Chris Stengel 1981 274 p
Avail: Univ. Microfilms Order No. 8121248

A number of widely differing solutions can be obtained by minimization of the rms value of some linear function of the velocity. In this type of solution, the calculated velocity is shown to be a convolution of the true velocity with a so-called resolution function, which can be calculated and is ideally a delta function. Those solutions found include the minimum total (baroclinic plus barotropic) velocity and the minimum derivative velocity. The resolution functions that are associated with each solution, however, are very poor approximations to delta functions. It is much more fruitful to calculate bounds on parameters such as the average velocity. With this technique, the velocity is expected as a series in a set of expansion functions. The convolution of each function with the velocity produces, in turn, each desired parameter. From an estimate of the rms difference between the expansion and the true velocity, the parameters can be bound. Dissert. Abstr.

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-11757*# National Aeronautics and Space Administration, Washington, D. C.
CYCLIC NUCLEOTIDES IN TISSUES DURING LONG-TERM HYPOKINESIA
V. F. Makeyeva, G. S. Komolova, I. A. Yegorov, L. V. Serova, and N. A. Chelnaya Oct. 1981 6 p refs Transl. into ENGLISH from "Tsiklicheskiye Nukleotidy v Tkanyakh Pri Dlitelnoy Gipokinezii", Voprosy Meditsinskoy Khimii (USSR), Vol. 27, No. 1, 1981 p 59-61 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Bakh Inst. of Biochemistry, USSR
(Contract NASw-3541)
(NASA-TM-76726) Copyright. Avail: NTIS HC A02/MF A01 CSCL 06C

Male Wistar rates were kept hypokinetic by placing them in small containers for 22 days. Blood plasma cAMP content was subsequently found increased, and cGMP content decreased, in the experimental animals. Liver and thymus cAMP content was similar in the control and experimental animals. There was a 20 and 38% decrease of cAMP content in the kidneys and spleen, respectively. Hypokinesia's reduction of cyclic nucleotides seems to inhibit RNA and protein synthesis. Author

N82-11758*# National Aeronautics and Space Administration, Washington, D. C.
LASER INDUCED FLUOROESCENCE FROM ALGAE: RESULTS OF A SHIP-BORNE FIELD TEST
Britt Hartmann, Ove Steinvall, and Anders Widen Sep. 1981 44 p refs Transl. into ENGLISH of "Laserinducerad Fluorescens from Alger: Resultat fraan ett Baatburet Faeltfoersoek" Rept. FOA-C-30171-EL, Stockholm, Jul. 1979 p 1-51 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by National Defense
(Contract NASw-3541)
(NASA-TM-76626; FOA-C-30171-EL) Avail: NTIS HC A03/MF A01 CSCL 06C

A basis is provided for the feasibility of air-borne laser fluorosensing not only of chlorophyll but also of pollutants such as oils and chemicals. There was a satisfactory correlation between the laser data and those obtained manually. The absolute determination of the chlorophyll concentration is discussed. T.M.

N82-11759*# National Aeronautics and Space Administration, Washington, D. C.
ELECTRON MICROSCOPICAL AND HISTOCHEMICAL STUDIES ON THE TRANSVERSE STRIATED MUSCLES OF BIRDS AFTER PROLONGED HYPOKINESIS
M. Belak, J. Kocisova, J. Marcanik, K. Boda, and R. Skarda Aug. 1981 14 p refs Transl. into ENGLISH from Arch. Exp. Veterinarmed. (E. Germany) v. 33, no. 1, 1979 p 37-46 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76717) Avail: NTIS HC A02/MF A01 CSCL 06C

Studies of the gastrocnemius muscle were carried out in 4 month old cockerels of the laying hybrid after hypokinesis lasting 15 and 30 days. It was found that restricted movement resulted in dystrophic changes of myotibrils, enlargement of the sarcoplasmic reticulum and oedem of interfibrillar spaces. Histochemical studies revealed focuses of increased activity of non-specific esterase, decreased activity of dehydrogenase of lactic acid and a positive reaction of acid phosphatase. T.M.

N82-11760*# National Aeronautics and Space Administration, Washington, D. C.
PARTICIPATION OF THE HYPOPHYSEAL-ADRENAL CORTEX SYSTEM IN THROMBIN CLEARANCE DURING IMMOBILIZATION STRESS
B. A. Kudryashov, A. M. Uljanov, F. B. Shapiro, and G. G. Bazazyan Oct. 1981 15 p refs Transl. into ENGLISH from Folia Maematol. (Leipzig), v. 106, no. 2, 1979 p 244-253 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by State Univ. of Moscow
(Contract NASw-3542)
(NASA-TM-76729) Avail: NTIS HC A02/MF A01 CSCL 06C

Thrombin marked with I-131 resulted in a considerable increase of the thrombined clearance rate in healthy male rats during stress caused by an immobilization lasting 30 minutes, and in an increase of thrombin clearance occurred by a combination of immobilization and administration of adrenocorticotropin (ACTH). Contrary to ACTH, the thrombin clearance is not stimulated in healthy animals by hydrocortisone. The results of the examination are presented. S.L.

N82-11761# General Accounting Office, Washington, D. C. Community and Economic Development Div.
INFORMATION OF MISSION AND FUNCTIONS OF THE NATIONAL BUREAU OF STANDARDS
22 Apr. 1981 96 p
(PB81-228207; CED-81-39) Avail: NTIS HC A05/MF A01 CSCL 05A

The Subcommittee on Science, Research and Technology, House Committee on Science and Technology, was concerned that the Bureau of Standards appeared divided in carrying out its functions under enabling legislation and subsequent legislative mandates and saw a need to hold hearings on the organic act, the law establishing the Bureau. GAO identified several matters which the subcommittee may wish to explore during hearings that may help the Bureau carry out its current and future responsibilities. GRA

N82-11762 Joint Publications Research Service, Arlington, Va.
USSR REPORT. LIFE SCIENCES BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 12
30 Oct. 1981 62 p refs Transl. into ENGLISH from various Russian publications
(JPRS-79338) Copyright. Avail: JPRS, Arlington, Va.

A mathematical model of the human memory depository is presented, the investigation of the otolithic reflex and the space perception functions of cosmonauts is described, and requirements for an automated measuring and computing complex for studies in human factors engineering are described. For individual titles, see N82-11763 through N82-11765.

N82-11763# Joint Publications Research Service, Arlington, Va.

TIME AND INFORMATION MODEL OF HUMAN MEMORY ORGANIZATION **c53**

V. A. Ganzen and D. A. Igonin *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 23-33 refs Transl. into ENGLISH from Vestn. Leningr. Univ.: Ekon., Filosofiya, Pravo (USSR), no. 5, issue 1, Mar. 1981 p 47-56 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

A dimensional and structural model of the human memory depository is presented. Quantitative estimates of the size of the memory depository are made and the organization of the system of memory traces in a hypothetical functional space of the memory is described in psychological terms. In the model, the volume (capacity) of the depository refers to the number of storage units in it, while the concept of structure characterizing the distribution of traces in the depository is interpreted as the structure of order. Only those parts of the depository that are responsible for fixing traces of various forms of symbolic material, such as meaningless syllables, words, or the graphic signs of a written language, are considered. J.D.H.

N82-11764# Joint Publications Research Service, Arlington, Va.

OTOLITHIC REFLEX AND SPACE PERCEPTION FUNCTION OF COSMONAUTS **c52**

I. Ya. Yakovleva and L. N. Kornilova *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 34-38 refs Transl. into ENGLISH from Vestn. Otorino-Laringol. (USSR), no. 4, Jul. - Aug. 1981 p 3-6 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

The reactions of the vestibular system and the space perception function to space flight are described. Data from preflight and postflight examinations of 24 cosmonauts following ten short term (4-19 days) and five long term (30-175 days) flights was analyzed. The otolithic reflex was investigated according to the intensity of the reaction of eyeball counterrotation, using a visual successive image representation in a transition from vertical to horizontal position to the right and left side. The function of spatial coordinate perception was investigated in the sitting position and in a horizontal position on the right side. J.D.H.

N82-11765# Joint Publications Research Service, Arlington, Va.

MEASURING/COMPUTING COMPLEX FOR AUTOMATION OF ERGONOMIC EXPERIMENTS **c54**

O. V. Afanasyev, R. P. Burusuzov, and B. V. Yelatomtsev *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 41-47 refs Transl. into ENGLISH from Tekh. Estetika (USSR), no. 1, Jan. 1981 p 27-29 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

Hardware and software requirements for an automated measuring and computing complex for studies in human factors engineering are considered. A complex consisting of a YeS-1010 computer, a Plurimat-S signal analyzer, an experimental camera, and a test bunch consisting of a KL 104A LED indicator, subject console, tachistoscope, and EEG-111 electroencephalograph is described. The software for the computer and signal analyzer is described. J.D.H.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-11766 Royal Aircraft Establishment, Bedford (England). Library.

ON THE ACTIVE PART PLAYED BY THE HEART IN THE VENOUS RETURN OF THE BLOOD

W. Bohme Jun. 1980 104 p refs Transl. into ENGLISH from Ergeb. Physiol. (West Germany), v. 38, 1936 p 251-338 (RAE-Lib-Trans-2017; BR79520)

Evidence from X-ray experiments supporting the idea that the heart sucks blood into the atria during systole is reviewed. Both X-ray cinematography and kymography were used in studies on animals and humans with and without contrast media. When the volume of the ventricles decreases during systole, the volume of the atria increases markedly as the valve plane descends towards the apex, the calibre of the venae cavae decreases, and as shown by experiments involving injection of droplets of iodine containing oil, the blood accelerates towards the heart. Various pathological conditions, including respiratory and cardiac failure, pneumothorax, air and oil emboli, and the effects of some pharmacological agents are also discussed. A.R.H.

N82-11767 Royal Aircraft Establishment, Bedford (England). Library.

MECHANICAL IMPEDANCE OF THE HUMAN OUTER EAR

H. Els and J. Schroeter Feb. 1981 21 p refs Transl. into ENGLISH from Forschungsber. (West Germany), no. 238, 1980 (RAE-Lib-Trans-2065; BR80139) Copyright. Avail: Issuing Activity

The lack of a quick, cheap and accurate method of measuring the attenuation provided by hearing protectors hampered the development of these devices. Many efforts to provide such a method involved the design of an objective test apparatus or 'artificial head'. A major drawback to this solution was the lack of detailed information about the mechanical characteristics of the skin/flesh layer at the point of contact between the protector and the head of a wearer. The measurement of the mechanical impedance of the skin/flesh layer of 100 subjects at four points in the circumaural region and at a point in the outer ear canal is described. The application of these data to the design of an artificial skin/flesh layer for use on an 'artificial head' is discussed. T.M.

N82-11768 Pennsylvania State Univ., University Park.

AIRWAY GAS MIXING DURING REST AND BICYCLE EXERCISE Ph.D. Thesis

Deborah Marie Drechsler 1981 96 p
Avail: Univ. Microfilms Order No. 8120419

The increase in dispersion of an inert tracer bolus of helium or sulfur hexafluoride was used as a direct, non-invasive measure of longitudinal gas mixing in the conducting airways. Three types of experiments were performed. Firstly, inspiratory flow rate was varied between 0.2 and 1.8 l/s while the expiratory flow rate was held constant at 0.4 l/s. Measurements were made at penetration volumes (V) of 30, 90, and 150 ml, and tidal volume was 600 ml. The negative correlation of mixing with inspiratory flow rate at all three values of V suggests that airway gas mixing during inspiration is by turbulence. During the second group of experiments expiratory flow rate was varied from 0.2 to 2.5 l/s, and inspiratory flow rate was held constant at 0.4 l/s. The positive correlation of mixing with expiratory flow rate at all three values of V leads to the conclusion that airway gas mixing during expiration is by Taylor diffusion. The third group of experiments investigated the extent of cardiogenic gas mixing by comparing inert gas dispersion during bicycle ergometer exercise at 35 prcent V sub 02 max to that dispersion occurring with matched respiratory maneuvers at rest.
Dissert. Abstr.

N82-11769 Rochester Univ., N. Y.

HUMAN LYMPHOCYTE CALCIUM METABOLISM Ph.D. Thesis

Andrew Harry Lichtman 1981 207 p
Avail: Univ. Microfilms Order No. 8122380

A technique was developed for measuring the calcium content of a small number of cells using a graphite furnace atomic absorption spectrophotometer. The sensitivity of the graphite furnace technique was 60 times higher and the detection limit was 1500 times lower than a conventional flame atomic absorption technique. The low detection limit of the graphite furnace technique permitted studies of calcium metabolism in the available numbers of human lymphocytes. In the absence of serum, the lymphocyte calcium content doubled as the medium calcium concentration was increased from 1 micro mol/l 0.5 mmol/l. At medium calcium concentrations of 0.5 mmol/l and above, the lymphocyte calcium content was 1.0 mmol/l cells. In medium adjusted 2 mmol/l calcium, the lymphocyte calcium content doubled as the medium serum concentration was increased from 0 to 2 percent. At medium serum concentra-

tions of 2 percent and above, lymphocyte calcium content was 2 mmol/l cells. Dissert. Abstr.

N82-11770* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

LOGIC-CONTROLLED OCCLUSIVE CUFF SYSTEM Patent

Joseph T. Baker (Technology, Inc., Houston, Tex.), George W. Hoffler, Inventors (to NASA) (Technology, Inc., Houston, Tex.), and William N. Hursta Issued 13 Oct. 1981 6 p Filed 1 Jun. 1976 Supersedes N76-27839 (14 - 18, p 2369)
(NASA-Case-MSC-14836-1; US-Patent-4,294,261; US-Patent-Appl-SN-691647; US-Patent-Class-128-691; US-Patent-Class-128-327; US-Patent-Class-128-686) Avail: US Patent and Trademark Office CSCL 06B

An occlusive cuff system comprises a pressure cuff and a source of regulated compressed gas feeding the cuff through an electrically operated fill valve. An electrically operated vent valve vents the cuff to the ambient pressure. The fill valve is normally closed and the vent valve is normally open. In response to an external start signal, a logic network opens the fill valve and closes the vent valve, thereby starting the pressurization cycle and a timer. A pressure transducer continuously monitors the pressure in the cuff. When the transducer's output equals a selected reference voltage, a comparator causes the logic network to close the fill valve. The timer, after a selected time delay, opens the vent valve to the ambient pressure, thereby ending the pressurization cycle.

Official Gazette of the U.S. Patent and Trademark Office

N82-11771*# National Aeronautics and Space Administration, Washington, D. C.

EFFECTS OF CURATIVE TREATMENT EMPHASIZING ENDURANCE TRAINING ON THE PERFORMANCE AND BLOOD PRESSURE OF HYPERTENSIVE AND NORMOTENSIVES

F. Worms (Sanitarium of the Governmental Hospital) Jun. 1981 20 p refs Transl. into ENGLISH from Dtsche. Gesundheitswesen, v. 35, no. 31, 1980 p 1207-1212 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3199)
(NASA-TM-76520) Avail: NTIS HC A02/MF A01 CSCL 06P

The problem of normal values of blood pressure after exercise taking into account the blood pressure at the end of the exercise test is discussed. Hypertensives showed a lower working capacity than normotensives. In normotensives, however, systolic blood pressure at the end of an exercise correlated well with the working capacity. After the endurance cure submaximal blood pressure was markedly lower in hypertensives with a striking dependence on the level of initial values. Systolic blood pressure at the end of an exercise test was not changed significantly. Most probably it is not possible to overcome this malregulation in hypertensives by endurance training alone. T.M.

N82-11772# Naval Ocean Systems Center, San Diego, Calif. Bureau of Medicine and Surgery.

REMOTE MEDICAL DIAGNOSIS SYSTEM RMDS DESIGN REVIEW MEETING MINUTES Technical Report, Aug. - Oct. 1980

W. T. Rasmussen and I. Stevens Aug. 1981 86 p refs Conf. held at Washington, D.C., 27-28 Aug. 1980
(AD-A104555; NOSC/TD-464) Avail: NTIS HC A05/MF A01 CSCL 06/5

Contains the minutes of a design review meeting for the Remote Medical Diagnosis System (RMDS) held 27-28 August, 1980, at the Bureau of Medicine and Surgery (Department of the Navy), Washington, DC. These minutes reflect the discussions held and information exchanged at this review meeting. They paraphrase various discussions, and are not intended as complete verbatim minutes. This document also contains background and reference material on the RMDS project.

Author (GRA)

N82-11773# Brookhaven National Lab., Upton, N. Y. Medical Research Center.

INTERCOMPARISON OF TECHNIQUES FOR THE NON-INVASIVE MEASUREMENT OF BONE MASS

S. H. Cohn 1981 14 p ref Presented at the 16th European Symp. on Calcified Tissue, Knokke, Belgium, 1981
(Contract DE-AC02-76CH-00016)
(DE81-029921; BNL-29958) Avail: NTIS HC A02/MF A01

A variety of methods are presently available for the measurement of both normal individuals and patients with metabolic disorders. Chief among these methods are radiographic techniques such as radiogrammetry, photon absorptiometry, computer tomography, Compton scattering and neutron activation analysis. In this review, the salient features of the bone measurement techniques are discussed along with their accuracy and precision. The advantages of the various techniques for measuring bone mass are summarized. Where possible, intercomparisons are made of the various techniques. DOE

N82-11774# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

DARTAB: A PROGRAM TO COMBINE AIRBORNE RADIONUCLIDE ENVIRONMENTAL EXPOSURE DATA WITH DOSIMETRIC AND HEALTH EFFECTS DATA TO GENERATE TABULATIONS OF PREDICTED HEALTH IMPACTS

C. L. Begovich, K. F. Eckerman, E. C. Schlatter, S. Y. Ohr, and R. O. Chester Aug. 1981 79 p refs
(Contract W-7405-eng-26)
(DE81-030434; ORNL-5692) Avail: NTIS HC A05/MF A01

The DARTAB computer code which combines radionuclide environmental exposure data with dodimetric and health effects data to generate tabulations of the predicted impact of radioactive airborne effluents is discussed. DARTAB is independent of the environmental transport code used to generate the environmental exposure data and the codes used to produce the dosimetric and health effects data. The human dose and risk calculations need not be added to every environmental transport code. Options are included in DARTAB to permit the user to request tabulation by various topics. DOE

N82-11775# Brookhaven National Lab., Upton, N. Y. Medical Research Center.

USE OF NUCLEAR RESONANT SCATTERING OF GAMMA RAYS FOR IN VIVO MEASUREMENT OF IRON

David Vartsky, Lucian Wielopolski, Kenneth J. Ellis, and Stanton H. Cohn 1981 20 p refs Presented at the Conf. on X- and Gamma-Ray Sources and Appl., Ann Arbor, Mich., 10 Jun. 1981
(Contract DE-AC02-76CH-00016; Grant PHS-R01-HL-24177)
(DE81-026051; BNL-29737; CONF-810647-8) Avail: NTIS HC A02/MF A01

A technique for determination of elements in human body in vivo, utilizing nuclear resonant scattering of Gamma rays was developd with this technique 847 keV photons emitted from a gaseous 55MnCl sub 2 source are resonantly scattered from 56Fe present in the body. The detection of these Gamma rays is used to estimate the iron content of the liver or heart of patients. Details of the calibration procedure and potential molecular effects are described. DOE

N82-11776# Massachusetts General Hospital, Boston. Radiology Research Lab.

MOLECULAR EVENTS BASIC TO CELLULAR RADIATION RESPONSE

G. M. Kolodny [1981] 23 p refs Prepared in cooperation with Beth Israel Hospital, Boston
(Contracts DE-AS02-76EV-03335; EY-76-S-02-3335)
(DE81-027898; DOE/EV-03335/T1; COO-3335-28) Avail: NTIS HC A02/MF A01

The initiation and control of the division process in normal cells to gain insight into changes caused by x-irradiation and neolasia was discussed. It is suggested that small molecular weight RNA acts as primer for new RNA synthesis by hybridizing with DNA and there initiating the transcription of a new RNA chain. It is indicated that small molecular weight RNA will induce the production of new proteins. It is demonstrated RNA taken up from the media by cells in culture and induce in vitro the production of differential cell products. DOE

N82-11777# Oak Ridge National Lab., Tenn.

ALTERED TISSUE REACTIVITY AND INTERACTIONS BETWEEN CHEMICALS

H. P. Witschi 1981 33 p refs Presented at NRC Workshop on Multichem. Contamination, Milan, 27 Apr. 1981
(Contract W-7405-eng-26)
(DE81-023189; CONF-810491-1) Avail: NTIS HC A03/MF A01

The interaction between chemicals which modify the biological response if exposure is simultaneous or sequential was explored. Two different situations are distinguished where interactions are caused by sequential exposure: (1) a first agent acts as an inducer or inhibitor of mixed function oxidases, this alters the response to a second, challenging agent and the nature of the biological response, is dicated by the second agent; and (2) a first agent produces slight or undetected or undetectable changes in a tissue, exposure to a second agent enhances or allows expression of the biological response determined by the first agent. Both types of interactions require an ordered sequence of exposure to two chemicals and complex dose effect and time effect relationships. DOE

N82-11778# North Carolina Univ. at Chapel Hill. School of Medicine.
NEW APPROACHES TO QUANTITATING THE PULMONARY EFFECTS ON INHALED POLLUTANTS Final Report, 25 Jul. 1977 - 24 Jul. 1980
Philip A. Bromberg, R. C. Boucher, M. Friedman, M. J. Hazucha, and R. L. Pimmell Jul. 1981 33 p refs
(Grant EPA-R-805184)
(PB81-222382; EPA-600/1-81-052) Avail: NTIS HC A03/MF A01 CSCL 06T

The following techniques described make continuous measurements of large airways caliber rapid methods for invasively measuring respiratory mechanics using forced random noise excitation at the mouth; a nontraumatic technique to measure transepithelial potential difference across respiratory (nasal and airways) epithelium; tracheal epithelial permeability in vivo, demonstrating increased permeability and decreased permselectivity; a rapid noninvasive multigas rebreathing technique to measure lung water and O3 induced pulmonary. GRA

N82-11779# Creighton Univ., Omaha, Nebr.
OZONE EXPOSURE AND PULMONARY METABOLIC EFFECTS OF MEDIATORS AND HORMONES Final Report, 20 Nov. 1976 - 31 Aug. 1980
Ibert C. Wells Jul. 1981 25 p
(Grant EPA-R-804585)
(PB81-222408; EPA-600/1-81-051) Avail: NTIS HC A02/MF A01 CSCL 06T

Several physiological effects of ozone exposure involving smooth muscle contracting substances were studied. The exposure of rats to ozone concentrations of 0.5 or 1.0 ppm for 4.0 hours produced the following effects in their lungs: (1) the release of prostaglandin F2 alpha and thromboxane A2 (2) increased the angiotensin converting enzyme activity, and (3) decreased the uptake of serotonin from the blood. Histamine and slow reacting substance of anaphylaxis were not released nor was the histamine forming capacity of the lung altered. Succinoxidase activity decreased by short exposure to ozone and increased by long exposure. GRA

N82-11780# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Surveillance, Hazard Evaluations and Field Studies.
CARBON/GRAPHITE FIBERS: ENVIRONMENTAL EXPOSURES AND POTENTIAL HEALTH IMPLICATIONS
Ralph D. Zumwalde and Lowell T. Harmison 12 Dec. 1980 21 p refs
(PB81-229692; IWS-52.3) Avail: NTIS HC A02/MF A01 CSCL 06J

Health effects related to carbon (7449440), and graphite (7782425) fiber exposure are discussed. Industrial production of the fibers is reviewed. Data on fiber release and particle size is included. The results of epidemiological and animal toxicologic studies with fibrous glass (14808607), rock wool wollastonite (13983170), fibrous clay, asbestos (1332214) and carbon fibers are described. Animal toxicity tests based on fiber size, deposition pattern and cause of death are recommended. The synergistic effect between carbon/graphite fiber exposure and cigarette smoke also should be studied. Worker exposures to these fibers should be kept as low as possible and managed in the same way as exposure to fibrous glass. GRA

N82-11764# Joint Publications Research Service, Arlington, Va.
OTOLITHIC REFLEX AND SPACE PERCEPTION FUNCTION OF COSMONAUTS
I. Ya. Yakovleva and L. N. Kornilova *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 34-38 refs Transl. into ENGLISH from Vestn. Otorino-Laringol. (USSR), no. 4, Jul. - Aug. 1981 p 3-6 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-11763# Joint Publications Research Service, Arlington, Va.
TIME AND INFORMATION MODEL OF HUMAN MEMORY ORGANIZATION
V. A. Ganzen and D. A. Igonin *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 23-33 refs Transl. into ENGLISH from Vestn. Leningr. Univ.: Ekon., Filosofiya, Pravo (USSR), no. 5, issue 1, Mar. 1981 p 47-56 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-11781# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Equipment Engineering.
INVESTIGATION OF SPATIAL DISORIENTATION OF F-15 EAGLE PILOTS Final Report, 15 Jan. - Aug. 1980
Dennis W. Jarvi Aug. 1981 72 p refs
(AD-A104684; ASD-TR-81-5016) Avail: NTIS HC A04/MF A01 CSCL 05/8

An extensive investigation, including F-15 pilot interviews at Eglin AFB FL, and Langley AFB VA, into the characteristics and operation of the F-15 Eagle was conducted over a seven month period. In addition, F-16 pilots at Hill AFB UT, were interviewed. The following conclusions were drawn from the information acquired: The F-15 does not possess any unusual flight handling characteristics that could lead to pilot spatial disorientation. The large bubble canopy and the pilot's sitting height in the cockpit generally do not appear to significantly contribute to spatial disorientation. The asymmetrical exterior lighting strips on the F-15 can cause confusion on the part of the wing man regarding his formation position relative to the lead aircraft or the bank angle of the lead aircraft. Night formation join-ups, particularly from the stern, are rather difficult for the F-15 pilot due to the absence of adequate exterior lighting to provide the necessary depth perception cues for ascertaining the range and attitude of the lead aircraft. The layout of the F-15 cockpit generally manifests adherence to good human factors design principles. The F-15 Spatial Disorientation Team also uncovered some areas of potential pilot distraction. These areas, uncovered during pilot interviews, do not necessarily affect the incidence of spatial disorientation, but may add to the F-15 pilot's workload. The report includes these areas, and also makes a number of recommendations based on the results of the study. GRA

N82-11782# Foster-Miller Associates, Inc., Waltham, Mass. Mining Div.
RECOMMENDED GUIDELINES FOR OXYGEN SELF-

RESCUERS. VOLUME 1: UNDERGROUND COAL MINING Progress Report, Aug. 1979 - Dec. 1980
D. Randolph Berry and Donald W. Mitchell Jun. 1981 52 p 2 Vol.
(Contract DI-BM-J0199118)
(PB81-225872; BM-OFR-86(1)-81-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 08I

The Bureau of Mines awarded a contract for the provision of recommendations on the safest, most practical methods for complying with new regulations requiring that all underground coal miners have a self-contained, self rescuer (SCSR) -- a device capable of supplying, in an emergency, 1 hour of self-contained oxygen (no breathing of mine air). Information and recommendations that could be used during the early stages of nationwide compliance, especially in the areas of inspection, testing, and underground storage os SCSR's, are presented. An executive summary, introduction, definitions, recommended guidelines for district managers and mine operators, and a storage plan checklist and sample form are provided. GRA

N82-11783# Foster-Miller Associates, Inc., Waltham, Mass. Mining Div.
RECOMMENDED GUIDELINES FOR OXYGEN SELF-RESCUERS. VOLUME 2: APPENDICES Progress Report, Aug. 1979 - Dec. 1980
D. Randolph Berry and Donald W. Mitchell Jun. 1981 265 p refs 2 Vol.
(Contract DI-BM-J0199118)
(PB81-225880; BM-OFR-86(2)-81-Vol-2) Avail: NTIS HC A12/MF A01 CSCL 08I

The report covers a discussion of the recommended guidelines, worldwide use of oxygen self-rescuers, hypothetical use of oxygen self-rescuers in post-1972 coal mine explosions and fires, vibration testing of self-contained, self-rescuers (SCSR's), and testing of in-service SCSR's. Discussions with representatives of underground coal mining, recommendations for SCSR storage containers, example of SCSR storage plans, testing of in-service compressed oxygen SCSR's, and 30 CFR 75.1714, 30 regulations pertaining to self-rescuers are presented. GRA

N82-11765# Joint Publications Research Service, Arlington, Va.
MEASURING/COMPUTING COMPLEX FOR AUTOMATION OF ERGONOMIC EXPERIMENTS
O. V. Afanasyev, R. P. Burusuzov, and B. V. Yelatomtsev *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 12 (JPRS-79338) 30 Oct. 1981 p 41-47 refs Transl. into ENGLISH from Tekh. Estetika (USSR), no. 1, Jan. 1981 p 27-29 (For primary document see N82-11762 02-51)
Avail: JPRS, Arlington, Va.

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering*.

N82-11784*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Data Systems Lab.
SPACE SHUTTLE MAIN ENGINE CONTROLLER
Russell M. Mattox and J. B. White Nov. 1981 40 p refs
(NASA-TP-1932; M-360) Avail: NTIS HC A03/MF A01 CSCL 09B

A technical description of the space shuttle main engine controller, which provides engine checkout prior to launch, engine control and monitoring during launch, and engine safety and monitoring in orbit, is presented. Each of the major controller subassemblies, the central processing unit, the computer interface electronics, the input electronics, the output electronics, and the power supplies are described and discussed in detail along with engine and orbiter interfaces and operational requirements. The controller represents a unique application of digital concepts, techniques, and technology in monitoring, managing, and controlling a high performance rocket engine propulsion system. The operational requirements placed on the controller, the extremely harsh operating environment to which it is exposed, and the reliability demanded, result in the most complex and rugged digital system ever designed, fabricated, and flown. Author

N82-11785*# National Aeronautics and Space Administration. Pasadena Office, Calif.
AUTOMATIC MULTI-BANKING OF MEMORY FOR MICROPROCESSORS Patent Application
Gordon A. Wiker, Inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 7 Aug. 1981 19 p
(Contract NAS7-100)
(NASA-Case-NPO-15295-1; US-Patent-Appl-SN-291645) Avail: NTIS HC A02/MF A01 CSCL 09B

A microprocessor system is provided with added memories to expand its address word length capacity by using indirect addressing instructions of a type having a detectable operations code and dedicating designated address spaces of memory to each of the added memories, one space to a memory. By decoding each operations code of instructions read from main memory into a decoder to identify indirect addressing instructions of the specified type, and then decoding the address that follows in a decoder to determine which added memory is selectively enabled to permit the instruction to be executed on the location to which the effective address of the indirect address instruction points, either before the indirect address is read from main memory or afterwards, depending on how the system is arranged by a switch. NASA

N82-11786# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
FIDELITY OPTIMIZATION OF MICROPROCESSOR SYSTEM SIMULATIONS M.S. Thesis Auburn Univ.
Earnest Taylor Landrum, Jr. Mar. 1981 119 p refs
(AD-A104679; AFIT-CI-81-3T) Avail: NTIS HC A06/MF A01 CSCL 09/2

The development of a microprocessor system simulation that would accurately portray the operation of the system at a very fine level of detail was studied. This optimization in the area of fidelity was broken into three tasks. A preprocessor program was written to improve the operator interface to an existing simulation driver program. An existing microprocessor simulation, designed to run under the simulation driver program, was extensively modified to reflect actual machine level operations rather than abstract level functions. A simulation of a programmable parallel interface was developed and mated to the microprocessor simulation. Examples and possibilities for system level simulation are discussed and analyzed. Author (GRA)

N82-11787# Naval Research Lab., Washington, D. C.
ARCHITECTURE TUNING OF A REAL-TIME SIGNAL

SORTER IN A DENSE ENVIRONMENT Interim Report
T. R. Husson, R. H. Evans, L. H. Moffett, and A. M. Abdalla 11 Sep. 1981 34 p
(AD-A104524; NRL-8495) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes the results of a study of the architecture of a real-time signal sorting system. The purpose of the signal sorter is to process and identify the outputs of a radar receiver. The problems of high data rates and uncertain environment characteristics require an adaptive system. The study began with a previously designed signal sorting architecture and the effects of various dynamic architecture tuning schemes on that system were analyzed. Author (GRA)

N82-11788# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
THE CROSSTIE RANDOM ACCESS MEMORY (CRAM). PART 1: THE CONCEPT AND INITIAL STUDIES
Leonard J. Schwee, Paul E. Hunter, Kathleen A. Restorff, and Mary T. Shephard 8 Jun. 1981 40 p refs
(WF62582000)
(AD-A104543; NSWC/TR-81-213-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

This is the first annual technical report of progress toward a crosstie random access memory. This marks a recent change in direction from the previously studied serial access memory. The more pertinent information learned from the serial memory approach which applies to the CRAM is repeated here. However, previous reports contain much additional important information and can be obtained by writing to the authors. It was realized at NSWC that the crosstie memory elements could be reorganized into a random access memory and that this approach would eliminate some propagation problems which resisted easy resolution. At the same time, a much higher performance memory would result with higher expected reliability. Consequently, efforts at NSWC are being concentrated on the CRAM. GRA

N82-11789# Denelcor, Inc., Denver, Colo.
MULTIPLE-INSTRUCTION, MULTIPLE-DATA PATH COMPUTERS: PARALLEL PROCESSING IMPACT ON FLIGHT SIMULATION SOFTWARE Final Report
Robert E. Lord, Swarn Kumar, and Rodney A. Schmidt Aug. 1981 101 p refs Prepared in cooperation with Washington State Univ., Pullman
(Contract F33615-79-C-0009; AF Proj. 6114)
(AD-A104506; AFHRL-TR-80-64) Avail: NTIS HC A06/MF A01 CSCL 09/2

The purpose of this study was to evaluate the parallel processing impact of MIMD (Multiple-Instruction Multiple-Data Path) computers on Flight Simulation Software. Basic mathematical functions and arithmetic expressions from typical Flight Simulation Software were selected and run on a MIMD computer to evaluate the improvement in execution time that results from the parallel architecture of this type of computer. Recommendations as to the types of tasks which are optimally suitable for this computer architecture are made, together with the improvement in execution speed to be expected. Author (GRA)

N82-11790# Ohio State Univ., Columbus. Computer and Information Science Research Center.
DESIGN AND ANALYSIS OF A MULTI-BACKEND DATABASE SYSTEM FOR PERFORMANCE IMPROVEMENT, FUNCTIONALITY EXPANSION AND CAPACITY GROWTH, PART 2
David K. Hsiao and M. Jaishankar Menon Aug. 1981 119 p refs
(Contract N00014-75-C-0573)
(AD-A104445; OSU-CISRC-TR-81-8) Avail: NTIS HC A06/MF A01 CSCL 09/2

This is Part II of the design and analysis of a multiple back-end database management system, known as MDBS. This part consists of the remaining of four chapters of the design and analysis details. The first four chapters were issued a month ago as Part I. For an abstract of the entire work, the reader is to refer to the abstract of Part I. An implementation team is pursuing the instrumentation of MDBS as designed and analyzed in Parts I and II. It is hoped that studies and testings of the experimental MDBS may be used to verify our analytic and simulation findings on the MDBS design and performance. Author (GRA)

N82-11791# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DISTRIBUTED COMPUTATION OF FIXED POINTS
Dimitri P. Bertsekas Aug. 1981 18 p refs
(Contract N00014-75-C-1183; NR Proj. 049-383)
(AD-A104418; LIDS-P-1135) Avail: NTIS HC A02/MF A01 CSCL 09/2

We present an algorithmic model for distributed computation of fixed points whereby several processors participate simultaneously in the calculations while exchanging information via communication links. We place essentially no assumptions on the ordering of computation and communication between processors thereby allowing for completely uncoordinated execution. We provide a general convergence theorem for algorithms of this type, and demonstrate its applicability to several classes of problems including the calculation of fixed points of contraction and monotone mappings arising in linear and nonlinear systems of equations, shortest path problems, and dynamic programming. Author (GRA)

N82-11792# Naval Postgraduate School, Monterey, Calif.
COMPUTER PERFORMANCE PREDICTION OF A DATA FLOW ARCHITECTURE M.S. Thesis
David John Hogen Jun. 1981 92 p refs
(AD-A104587) Avail: NTIS HC A05/MF A01 CSCL 09/2

Supercomputers capable of performing extremely high speed computation have been proposed which are based on an architecture known as data flow. Application of a Petri net-based methodology is used to evaluate the performance attainable by such an architecture. The architecture evaluated is MIT's cell block data flow architecture which is being developed to execute the applicative programming language VAL. Results show that for the data flow architecture to achieve its goal of high speed computation, intelligent multiprogamming schemes need to be developed. One such scheme, based on the notion of a 'concurrency vector', is introduced. Author (GRA)

N82-11793# Naval Postgraduate School, Monterey, Calif.
A MICROPROCESSOR DEVELOPMENT SYSTEM FOR THE ALTOS SERIES MICROCOMPUTERS M.S. Thesis
Stephen Michael Hughes Jun. 1981 150 p refs
(AD-A104624) Avail: NTIS HC A07/MF A01 CSCL 09/2

An ALTOS series microcomputer is being used as the host computer in a microprocessor development system (MDS). The MDS hardware, consisting of the PRO-LOG STD bus, a Z80 cpu card, 2K bytes EPROM and 36K bytes random access memory, is controlled by the host via a single serial I/O port. The system provides the capability to develop and test both software and hardware in the combined CP/M (MP/M) and MDS environments. Author (GRA)

N82-11794# Naval Ship Research and Development Center, Bethesda, Md.
A BACK-END DATA MANAGEMENT EXPERIMENT Final Report
Michael A. Wallace Sep. 1981 75 p refs
(TF5351019)
(AD-A104579; DTNSRDC-81/067) Avail: NTIS HC A04/MF A01 CSCL 09/2

A test system was developed under contract to demonstrate the feasibility of the back-end processor approach. This system was installed on the PDP 11/70 (back-end processor) and tested for validity and performance. This test effort, sponsored primarily by NAVSUP, was to determine whether the originally perceived benefits could be realized and the disadvantages minimized. The perceived benefits were: reduced disk space; reduced main memory for application programs; reduced CPU time for application programs; increased data security; increased host utilization by linking several hosts to one back-end processor; independence of the DBMS from the host processor; and extend the useful life cycle of the host by freeing system resources. The known disadvantages are: an additional computer to operate and maintain; a communications link to maintain, and a development, implementation, and maintenance software effort

on two machines. The system implementation, testing methodology, analysis of results, and conclusions/recommendations are discussed in this report. GRA

N82-11795# California Univ., Berkeley. Lawrence Berkeley Lab. Physics, Computer Science and Mathematics Div.
EFFICIENT METHODS FOR CALCULATING THE SUCCESS FUNCTION OF FIXED-SPACE REPLACEMENT POLICIES M.S. Thesis
Frank Olken May 1981 30 p refs
(Contract W-7405-eng-48)
(DE81-029847; LBL-12370) Avail: NTIS HC A03/MF A01

Efficient methods are discussed for calculating the success function of replacement policies used to manage very large fixed size caches. Such problems arise in studying the caching of files on disk. A class of replacement policies is characterized which makes it possible to evaluate the success function for a single cache size in time O(n(*)log(s)), where n is the number of memory references in the trace and s is the size of cache. An algorithm is constructed to evaluate the success function for the least recently used replacement policy in time O(n(*)log(s)), for cache sizes smaller than s. This algorithm runs in bounded memory, O(s). It is also shown how to modify Bennett and Kruskal's algorithm to run in bounded space. The two algorithms have the same asymptotic running times (within a constant factor). Measured running times for the classic least recently used algorithm, (Bennett and Kruskal's algorithm) and the new algorithm are compared. The impace of variable size segments (files, rather than fixed size pages), and deletions on algorithms for calculating success functions is considered. DOE

N82-11796# Los Alamos Scientific Lab., N. Mex.
PHILOSOPHY OF SUPERCOMPUTING
J. Worlton Jun. 1981 32 p refs Presented at the Conf. on High-Speed Computing., Glenenden Beach, Ore., 30 Mar. 1981; sponsored in part by Calif. Univ., Lawrence Livermore Lab.
(Contract W-7405-eng-36)
(DE81-028586; LA-8849-MS) Avail: NTIS HC A03/MF A01

A critical examination of some of the commonly held beliefs about supercomputing is presented. Basic problems, principles, and motivating concepts are included. L.F.M.

N82-11797# Sandia Labs., Albuquerque, N. Mex. Aerodynamics Simulation Div.
USE OF A HYBRID COMPUTER FOR THE FLIGHT SIMULATION OF A BOMB/PARACHUTE SYSTEM
J. K. Cole 1981 26 p refs Presented at the User Soc. Meeting for the Appl. Dyn. System 10, Pacific Grove, Calif., 9 May 1981
(Contract De-AC04-76DP-00789)
(DE81-025141; SAND-81-1041C; CONF-810521-2) Avail: NTIS HC A03/MF A01

The use of a flight simulation laboratory for a 12 degree of freedom simulation of a bomb/parachute system is described. The simulation results are compared with data from flight tests. DOE

N82-11798# Federal Compiler Testing Center, Falls Church, Va.
COBOL COMPILER: MOHAWK DATA SCIENCES MDS COBOL RELEASE 12 ANSI 74, SERIES 21-MODELS 40, 50, SERIES 21 OPERATING SYSTEM 2
29 Jun. 1981 52 p
(PB81-226425; CCVS74-VSR800) Avail: NTIS HC A04/MF A01 CSCL 09B

The validation Summary Report (VSR) for the Mohawk Data Sciences COBOL Compiler Version 12 ANSI 74 (Series 21 Version 2) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-11799# Federal Compiler Testing Center, Washington, D.C.
PERKIN-ELMER COBOL R06 PERKIN-ELMER MODEL 3240 OS/32 REV 05.02
17 Jun. 1981 47 p
(PB81-223885; CCVSR750) Avail: NTIS HC A03/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Perkin-Elmer COBOL Compiler Version R06 (OS/32 Version 05.02) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed. GRA

N82-11306*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GOLDSTONE (GDSCC) ADMINISTRATIVE COMPUTING
H. Martin *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 182-191 (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 09B

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-11800*# Research and Data Systems, Inc., Lanham, Md.
THERMAL ALGORITHMS ANALYSIS Final Report
Tina Lien May 1981 10 p
(Contract NAS5-25786)
(NASA-CR-166716) Avail: NTIS HC A02/MF A01 CSCL 09B

The programming and analysis methods to support the development of a thermal model of the Earth's surface from detailed analysis of day/night registered data sets from the Heat Capacity Mapping Mission satellite are briefly described. M.G.

N82-11801*# Goodyear Aerospace Corp., Akron, Ohio.
SAR PROCESSING ON THE MPP Final Report, 9 Jan. - 31 Aug. 1981
K. E. Batcher, E. E. Eddey, R. O. Faiss, and P. A. Gilmore Aug. 1981 88 p refs
(Contract NAS5-26430)
(NASA-CR-166726; GER-17020) Avail: NTIS HC A05/MF A01 CSCL 09B

The processing of synthetic aperture radar (SAR) signals using the massively parallel processor (MPP) is discussed. The fast Fourier transform convolution procedures employed in the algorithms are described. The MPP architecture comprises an array unit (ARU) which processes arrays of data; an array control unit which controls the operation of the ARU and performs scalar arithmetic; a program and data management unit which controls the flow of data; and a unique staging memory (SM) which buffers and permutes data. The ARU contains a 128 by 128 array of bit-serial processing elements (PE). Two-by-four surarrays of PE's are packaged in a custom VLSI HCMOS chip. The staging memory is a large multidimensional-access memory which buffers and permutes data flowing with the system. Efficient SAR processing is achieved via ARU communication paths and SM data manipulation. Real time processing capability can be realized via a multiple ARU, multiple SM configuration. M.G.

N82-11802# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
MECHANICAL TRANSFORMATION OF TASK HEURISTICS INTO OPERATIONAL PROCEDURES Ph.D. Thesis
David J. Mostow 14 Apr. 1981 511 p refs
(Contract F33615-78-C-1551; Grant NSF MCS-77-03273; ARPA Order 3597)

(AD-A104674; CMU-CS-81-113) Copyright. Avail: Issuing Activity CSCL 09/2

This dissertation characterizes the operationalization of advice as a series of problem transformations leading from the advice statement to a procedure for achieving a specified goal (avoid taking points) or evaluating a specified quantity (decide whether an opponent is void). It describes some general operators for performing such transformations. These operators have been implemented in a program called FOO as domain-independent transformation rules that access a knowledge base of task domain concepts. They have been used to operationalize advice for the card game Hearts and a music composition task. Some of FOO's transformation rules represent high-level strategies for operationalizing advice. Additional rules represent reasoning methods used to reformulate advice in terms of these operationalization strategies, solve the subproblems they generate, and translate their results into a usable form. Although FOO lacks a problem-solving component for choosing which of these transformation rules to apply, the dissertation shows how means-end analysis could be used to guide the search through the problem space. The dissertation formalizes the notion of reformulating one concept in terms of another, for example, reformulating 'take points' in terms of 'playing the highest card in the suit led.' It describes mechanical techniques for mapping domain-specific problems onto general methods. In particular, it examines in detail the process of formulating a problem as a heuristic search, and presents domain-independent rules that improve a search procedure by deriving new heuristics based on analysis of the problem and knowledge about the task domain. GRA

N82-11803# SRI International Corp., Menlo Park, Calif. Computer Science Lab.

OBJ-1: A STUDY IN EXECUTABLE ALGEBRAIC FORMAL SPECIFICATION Final Report

Joseph A. Goguen and Jose Meseguer Jul. 1981 66 p refs (Contract N00014-80-C-0296; NR Proj. 049-466; SRI Proj. 1350-100)

(AD-A104468) Avail: NTIS HC A04/MF A01 CSCL 09/2

The goal of this research has been to develop a formal and executable algebraic specification language which can be used to specify a variety of application programs, such as database systems, compilers and interpreters for programming languages, and business systems. An advantage of formality in this context is that each specification has a unique unambiguous meaning, so that it is actually meaningful to ask whether or not a given program in fact satisfies a given specification. An advantage of executability is that test cases can be run directly on the specification, to examine properties of programs before they are written, and to help in debugging specifications. The latter is important because large specifications, like large programs, are usually wrong as first written. We have been investigating the utility of a number of potential advantages of the algebraic approach, including the following: Achievement of a high level of modularity in a natural way; Achievement of a high level of abstraction in a natural way; The possibility of executing test cases; User definition of data types and control structures, using any desired syntax, including pre-fix, post-fix, and 'mix-fix' operators, as well as coercions; The specification of error and exception conditions, as well as their handling, and recovery; The use of parameterized abstract modules as a method for structuring specifications; Algorithms for checking consistency and other desirable properties of specifications (e.g., the Knuth-Bendix algorithm); and Provision of a completely rigorous semantics for all these features. GRA

N82-11804# Logicon, Inc., San Pedro, Calif.

ANALYSIS OF 4&5 DATA Final Technical Report, 1 Apr. 1980 - 31 Mar. 1981

Jane W. Radatz Griffiss AFB, N.Y. RADC Jun. 1981 138 p refs

(Contract F30602-80-C-0115; AF Proj. 2528)

(AD-A104249; RSED-81319) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report presents the results of a one-year study of Independent Verification and Validation (IV&V) results. Five large IV&V projects are examined to determine the effects of IV&V on software reliability, maintainability, and development cost/productivity. Current literature relevant to these topics is surveyed. IV&V-detected anomalies are categorized as to location, error category, effect, severity, acceptance, and resolution. Differences in project results are used to formulate recommendations for improving IV&V effectiveness. Author (GRA)

N82-11805# Naval Postgraduate School, Monterey, Calif.

ELEMENTS OF PROGRAMMING LINGUISTICS. PART 1: THE LAMBDA CALCULUS AND ITS IMPLEMENTATION

Bruce J. MacLennan 13 Aug. 1981 95 p

(Contract N00014-81-WR-10034; RR0000110)

(AD-A104345; NPS52-81-012-Pt-1) Avail: NTIS HC A05/MF A01 CSCL 09/2

The lambda calculus is used as an introduction to programming language concepts, particularly the concepts of functional programming. Both interpreted and compiled implementations of an extended lambda calculus are discussed. They can be adopted to implementations of Pascal and Lisp. It is shown that traditional stack-based run-time structures can be directly derived from the reduction rules of the lambda calculus.

Author (GRA)

N82-11806# General Electric Co., Arlington, Va. Information Systems Programs Dept.

THE EFFECTS OF THE SYMBOLOGY AND SPATIAL ARRANGEMENT OF SOFTWARE SPECIFICATIONS IN A DEBUGGING TASK

Sylvia B. Sheppard, John W. Bailey, and Elizabeth Kruesi Aug. 1981 47 p refs

(Contract N00014-79-C-0595; NR Proj. 196-190)

(AD-A104541; TR-81-388200-4) Avail: NTIS HC A03/MF A01

This report describes the third in a series of experiments to evaluate the effects of the format of software specifications on programmer performance. The current experiment examined performance on a debugging task. Thirty-six professional programmers were presented with specifications for each of three modular-sized programs. Nine different specification formats were prepared for each program. These formats varied along two dimensions: type of symbology and spatial arrangement. The type of symbology included natural language, constrained language (PDL), and ideograms (flowchart symbols). The spatial arrangement included sequential (vertical flow), branching (flowchart), and hierarchical (tree-like). The participants compared correct specifications to error-seeded program listings. Their task was to locate the several errors per program and to correct the errors using a text editor. The program output was checked automatically and a message informed the participants whether the output was correct or incorrect. The participants were asked to continue debugging until all errors had been located and corrected. The difficulty of the debugging task was measured by the time required to detect and correct the errors and by the number of submissions required for a correct run. GRA

N82-11807# Air Force Human Resources Lab., Brooks AFB, Tex.

SECOND IMAGE GENERATION/DISPLAY CONFERENCE: CLOSING COMMENTS Final Report

Earl A. Alluisi Jul. 1981 62 p refs Conf. held at Phoenix, Ariz., 10-12 Jun. 1981

(AF Proj. 9983)

(AD-A104676; AFHRL-TP-81-28) Avail: NTIS HC A04/MF A01 CSCL 09/2

The paper briefly outlines the objectives and accomplishments of the conference and acknowledges the contributions of some specific individuals. The paper then addresses the state-of-the-art in image generation/display for flight simulation, which was the substantive area of the conference. In this regard, the paper discusses the AFHRL Advanced Simulator for Pilot Training (ASPT), its history, and its application to specific training areas such as conventional dive bomb tasks and low-angle strafe, using the A-10 configuration of the ASPT. Some experimental results are reported. Research and development (R and D) on the ASPT is now advancing to air combat mission training (CMT). The paper describes what is involved in realizing state-of-the-art CMT; namely, (1) a data base collection system, (2) an image generation system, and (3) a crew interface/display system. The status of AFHRL R and D in each of these areas is presented. Finally,

the need for addressing real and potential impacts of successful R and D in credible, quantitative terms is emphasized. A 'notional' CMT impact analysis is provided to show how R and D organizations can present options to Air Force management-options through which they can increase the ease and probability of air combat success. GRA

N82-11808# Naval Postgraduate School, Monterey, Calif.
CONDITION RECOGNITION FOR A PROGRAM SYNTHESIZER M.S. Thesis
Joseph Shawn Lape and Charles Wayne Miller Jun. 1981 147 p refs
(AD-A104586) Avail: NTIS HC A07/MF A01 CSCL 09/2

An enumeration algorithm which synthesizes programs from example computations is presented. The algorithm, originally proposed by Alan W. Biermann of Duke University, assigns a labelling of the instructions contained in an example trace consistent with producing minimum state Moore machine representations for the synthesized programs. Techniques for processing the information to reduce enumeration are given. Biermann's algorithm is extended by trace preprocessing techniques which identify and generalize conditions on instruction sequencing in the synthesized programs without the user's assistance. The techniques are presented using text editing as the domain, but are general enough to be extendable into other domains. Author (GRA)

N82-11809# Naval Postgraduate School, Monterey, Calif.
PROGRAMMING WITH A RELATIONAL CALCULUS
Bruce J. MacLennan 3 Sep. 1981 45 p refs
(RR0000110)
(AD-A104650; NPS52-81-013) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes the concept of programming in a relational calculus. This is a style of programming in which entire relations are manipulated rather than individual data, and in which the program itself is represented as a relation. Thus relational programming is more general than functional programming in three respects. First, it is more general because relations subsume functions. Second, it is more general because the same objects, viz. relations are used to represent both the program and the data. Finally, since complex data structures are easily represented as relations, relational programming can manipulate with facility a much wider class of structures that other very-high-level languages. Author (GRA)

N82-11810# California Univ., Livermore. Lawrence Livermore Lab.
SOFTWARE DESIGN OF A GENERAL PURPOSE DATA ACQUISITION AND CONTROL EXECUTIVE
William G. Labiak and Earl G. Minor 22 May 1981 5 p refs Presented at Topical Conf. on Computerized Data Acquisition in Particle and Nucl. Phys., Oak Ridge, Tenn., 28-30 May 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-026573; UCRL-85669; CONF-810523-9) Avail: NTIS HC A02/MF A01

The software design of an executive which performs general purpose data acquisition, monitoring, and control is presented. The executive runs on a memory-based mini- or micro-computer and communicates with a disk-based computer where data analysis and display are done. The executive design stresses reliability and versatility, and yields software which can provide control and monitoring for widely different hardware systems. Applications of this software on two major fusion energy experiments are described. DOE

N82-11811# California Univ., Berkeley. Lawrence Berkeley Lab. National Resource for Computation in Chemistry Office.
GRAMPS: A GRAPHICS LANGUAGE INTERPRETER FOR REAL TIME, INTERACTIVE, THREE DIMENSIONAL PICTURE EDITING AND ANIMATION
T. J. ODonnell and Arthur J. Olson Aug. 1981 11 p refs Presented at the SIGGRAPH 81 Meeting, Dallas, 3-7 Aug. 1981
(Contract W-7405-eng-48; Grant NSF CHE-77-21305)
(DE81-027398; LBL-12492; CONF-810805-6) Avail: NTIS HC A02/MF A01

An overview of the GRAMPS command structure is given and several examples of application of the language to molecular modeling and animation are presented. The GRAMPS language syntax allows natural interaction with scene elements, interactive assignment of graphics input devices, as well as facilitates the creation, manipulation and copying of complex nested picture structures. The language has a powerful macro feature that enables graphics commands to be developed and incorporated interactively. Animation is achieved in GRAMPS by two different, yet mutually compatible means. Picture structures may contain framed data, which consist of a sequence of fixed objects. These structures may be displayed sequentially to give a traditional frame animation effect. In addition, transformation information on picture structures may be saved at any time in the form of macro commands that transform these structures from one saved state to another in a specified number of steps, yielding an interpolated transformation animation effect. DOE

N82-11812# California Univ., Livermore. Lawrence Livermore Lab.
RATFIT: A RATIONAL EQUATION-OF-STATE FITTING PROGRAM
F. N. Fritsch Mar. 1981 40 p refs
(Contract W-7405-eng-48)
(DE81-027273; UCID-19097) Avail: NTIS HC A03/MF A01

The rational equation of state fitting program (RATFIT) fits an eleven-parameter equation of state of the form P(mu, epsilon) = A (mu) + B (mu) epsilon + C (mu) epsilon(2), /1+(D sub o) epsilon where A and B are cubic polynomials and C is quadratic, to (mu,P)-data given along the Hugoniot and/or the principal adiabat. It can also include data for gamma=(delta P/delta epsilon)/(mu + 1) along the abiabat. The user may weight individual points arbitrarily and fix any (or all) of the parameters at specified values. Printed and plotted output is available along the Hugoniot and adiabat associated with the equation of state. DOE

N82-11813# General Atomic Co., San Diego, Calif.
GUIDE TO THE DATA-ACQUISITION SOFTWARE OF THE DOUBLET III COMPUTER SYSTEM
B. B. McHarg Dec. 1980 73 p refs
(Contract DE-AT03-76ET-51011; Gen. Atomic Proj. 3344)
(DE81-026616; GA-A-16134) Avail: NTIS HC A04/MF A01

A guide to the software of the Doublet 3 data acquisition system is presented and the interactions of the computer codes with each other as well as with data base files, data files, and global tables, are discussed. Detailed descriptions of these files and tables are given along with methods of modification. The Doublet 3 Tokamak fusion experiment acquires, processes and archives over two megabytes of experimental data from each Tokamak shot, which occurs every five to seven minutes. The computer codes that accomplish this acquisition begin execution immediately on reboot of the computer system and continue throughout the preacquisition stage before a Tokamak shot, the actual acquisition stage when the shot is fired, and the post acquisition or analysis stage. DOE

N82-11814# Los Alamos Scientific Lab., N. Mex.
H-O PRECESSOR COMPUTER CODE
Olin B. vanDyck and Richard A. Floyd May 1981 43 p refs
(Contract W-7405-eng-36)
(DE81-026669; LA-8804-MS) Avail: NTIS HC A03/MF A01

The computer program used to predict the system performance of a prototype spin precessor using H(-) to H(0) stripping, followed by small precession magnets is described. Starting with a user-defined input beam and magnet system, the program calculates and graphs the beam polarization along the beam axis. Alternatively, the program can plot the polarization at fixed position as a function of the magnet field strength. The performance of the system was studied using the code. The fundamental physics of a system of spins with hyperfine coupling in a magnetic field are described along with many examples of beam behavior as calculated by the program. DOE

N82-11815 Pennsylvania State Univ., University Park.
COMPUTER PROCESSING OF PERIODIC ELECTRON MICROGRAPHS Ph.D. Thesis
Kirk Harvy Shelley 1981 245 p

Avail: Univ. Microfilms Order No. 8120464

Real image manipulation and harmonic analysis were combined in an attempt to extract the information contained in an electron micrograph. This type of analysis both simplified the image and quantified it to allow for easier interpretation. All the images studied were obtained from molecular aggregations with high degrees of intermolecular symmetry. Initially, electron micrographs produced from protein microcrystals were studied. These proteins included pig pancreas alpha-amylase, B. subtilis alpha-amylase, canavalin, and abrin. A series of low resolution (2.0 to 1.5 nm) electron density projections of the protein moleculs were produced. These projections allowed for the unambiguous placement of the molecules within the unit cell. From the projections, molecular dimensions and volumes could also be estimated. The application of computer image processing techniques to the electron micrographs of cellular crystalline inclusions is discussed. Dissert. Abstr.

62 COMPUTER SYSTEMS

Includes computer networks.

N82-11816*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPAR DATA SET CONTENTS
Sally W. Cunningham Oct. 1981 41 p refs
(NASA-TM-83181) Avail: NTIS HC A03/MF A01 CSCL 09B

The contents of the stored data sets of the SPAR (space processing applications rocket) finite element structural analysis system are documented. The data generated by each of the system's processors are stored in a data file organized as a library. Each data set, containing a two-dimensional table or matrix, is identified by a four-word name listed in a table of contents. The creating SPAR processor, number of rows and columns, and definitions of each of the data items are listed for each data set. An example SPAR problem using these data sets is also presented. M.G.

N82-11817*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISONS OF SOME LARGE SCIENTIFIC COMPUTERS
Karen R. Credeur Oct. 1981 38 p refs
(NASA-TM-81928) Avail: NTIS HC A03/MF A01 CSCL 09B

In 1975, the National Aeronautics and Space Administration (NASA) began studies to assess the technical and economic feasibility of developing a computer having sustained computational speed of one billion floating point operations per second and a working memory of at least 240 million words. Such a powerful computer woild allow computational aerodynamics to play a major role in aeronautical design and advanced fluid dynamics research. Based on favorable results from these studies, NASA proceeded with developmental plans. The computer was named the Numerical Aerodynamic Simulator (NAS). To help insure that the estimated cost, schedule, and technical scope were realistic, a brief study was made of past large scientific computers. Large discrepancies between inception and operation in scope, cost, or schedule were studied so that they could be minimized with NASA's proposed new compter. The main computers studied were the ILLIAC IV, STAR 100, Parallel Element Processor Ensemble (PEPE), and Shuttle Mission Simulator (SMS) computer. Comparison data on memory and speed were also obtained on the IBM 650, 704, 7090, 360-50, 360-67, 360-91, and 370-195; the CDC 6400, 6600, 7600, CYBER 203, and CYBER 205; CRAY 1; and the Advanced Scientific Computer (ASC). A few lessons learned conclude the report. Author

N82-11818# California Univ., Livermore. Lawrence Livermore Lab.
SOME NOTES ON OPERATING-SYSTEM PRINCIPLES
D. M. Nessett 22 Jul. 1981 262 p refs
(Contract W-7405-eng-48)
(DE81-030675; UCID-19076) Avail: NTIS HC A12/MF A01

The basic concepts governing the design of operating systems are discussed in detail. Architecture, memory management, process scheduling and synchronization, deadlocks, and access control are examined. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N82-11819 Clarkson Coll. of Technology, Potsdam, N.Y.
MATHEMATICAL INVESTIGATION OF LINEAR CONTROL SYSTEMS CONTAINING INPUT DERIVATIVES Ph.D. Thesis
Nazar Al-Nasr 1981 88 p
Avail: Univ. Microfilms Order No. 8121679

The simplest type of generalized inverses of matrices known as the (1)-inverse is used to investigate two problems in linear time-invariant multivariable systems that contain input derivatives. The first is the zero-in problem. This problem of finding zeros and zero directions of the system boils down to solving a generalized eigenvalue problem which under certain conditions can be reduced to an ordinary eigenvalue problem or to a simpler generalized eigenvalue problem by the aid of three theorems given in the second chapter. The other is the eigenvalue assignment problem. This is concerned with finding a constant feedback matrix that will result in a closed loop system having a prescribed set of desired eigenvalues. Dissert. Abstr.

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-11820 California Univ., Los Angeles.
UPWIND DIFFERENCE SCHEMES FOR HYPERBOLIC SYSTEMS OF CONSERVATION LAWS Ph.D. Thesis
Frederick William Solomon 1981 90 p
Avail: Univ. Microfilms Order No. 8122848

An extension of a shock capturing scheme is applied to well known systems found in fluid mechanics. Further as the scalar scheme possesses many desirable properties among them stability, monotinicity, and sharp profiles for steady shocks numerical experiments were performed to see how well these properties carry over to this extension for systems. Indeed numerical results were generated with the emphasis on viewing scheme stability and sharpness of shock profiles. Also for the scheme applied to the two dimensional isentropic Euler equations, there was great interest in the schemes performance with respect to oblique steady shocks (oblique w.r.t. the grid). Thus steady shock sharpness as a function of shock angle was viewed. The results indicate stability and profile sharpness for steady shocks for the one dimensional versions of the scheme. Further, the two dimensional results indicate that oblique steady shocks maintain sharp profiles in time regardless of the shock angle. Dissert. Abstr.

N82-11821 Rutgers - The State Univ., New Brunswick, N. J.
CHARACTERS OF RANK TWO HYPERBOLIC LIE ALGEBRAS AS FUNCTIONS AT QUASIREGULAR CUSPS Ph.D. Thesis
Arne Erik Meurman 1981 132 p
Avail: Univ. Microfilms Order No. 8122102

Using the Weyl-Kac character formula and the process of principal specialization, it is shown that the characters have poles when extended to meromorphic functions. Thus the expansion in terms of characters is genuinely local. The result that the rank two hyperbolic Lie algebras have exponential growth is also derived in the process. Dissert. Abstr.

N82-11822 Kentucky Univ., Lexington.
PARTIAL DIFFERENTIAL EQUATIONS FROM DYNAMIC PROGRAMMING EQUATIONS Ph.D. Thesis

Suzanne Marie Lenhart 1981 126 p
Avail: Univ. Microfilms Order No. 8121611

Equations which arise in stochastic optimal control theory were examined. The goal was to investigate these problems by analytic p.d.e. methods. The differential and integral operators satisfy the maximum principle in various forms, which enable pointwise estimates on the solution and its derivatives to be obtained. Variants of the Bellman Equation of dynamic programming were solved by approximating by a semilinear system of equations. Dissert. Abstr.

N82-11823 Pennsylvania State Univ., University Park.
NONCLASSICAL ORTHOGONAL POLYNOMIALS AND DIFFERENTIAL EQUATIONS Ph.D. Thesis
Lance Lee Littlejohn 1981 129 p
Avail: Univ. Microfilms Order No. 8120450

A class of orthogonal polynomials that are solutions to a sixth order formally self adjoint differential equation is discussed. These polynomials generalize the Legendre type polynomials. Many properties that these polynomials have in common with the classical orthogonal polynomials of Jacobi, Hermite, and Laguerre are also addressed. Dissert. Abstr.

N82-11824 California Univ., San Diego.
SPECIAL FUNCTIONS AND HARMONIC ANALYSIS ON P SUB N Ph.D. Thesis
Thomas Earl Bengtson 1981 109 p
Avail: Univ. Microfilms Order No. 8120518

The K-Bessel function is defined as an integral over P sub n, the Riemannian symmetric space of positive definite symmetric n x n matrices over R. The K-Bessel function is defined as an integral over Euclidean space. A 'complete the square' argument is used to relate the K-Bessel and K-Bessel functions. This is then used to derive other properties of these functions. An exposition of special functions on P sub n is given, including explicit calculations using invariant differential operators on P sub n. Since P sub n can be identified with the space of positive definite quadratic forms, an explicit formulation of harmonic analysis on P sub n should prove useful to number theorists. By translating the work of Harish-Chandra and Helgason into this special case, an exposition of harmonic analysis in geodesic polar coordinates on P sub n is given. Dissert. Abstr.

N82-11825 Washington Univ., Seattle.
MULTILINEAR PSEUDODIFFERENTIAL OPERATORS AND PARAPRODUCTS Ph.D. Thesis
Julian Aguirre 1981 155 p
Avail: Univ. Microfilms Order No. 8122722

Certain multilinear operators which commute with simultaneous translations and their action on different classes of functions were studied. The goal is a understanding of multilinear operator and their use in nonlinear analysis. Series of multilinear operators are the correct substitute for power series when studying non-linear functions that appear naturally in mathematics. The introduction of multilinear operators permits the use of Fourier methods that at first sight might appear unsuitable for the treatment of such problems. Non-isotropic dilations and independent dilations in each variable are considered and ultimately all dilation structure is eliminated by considering spaces of homogeneous type. Dissert. Abstr.

N82-11826# National Aerospace Lab., Tokyo (Japan).
A SECOND-ORDER ACCURATE PROCEDURE FOR SOLVING THE BOUNDARY LAYER EQUATIONS BASED ON THE PREDICTOR-CORRECTOR FORM OF THE CRANK-NICOLSON SCHEME
Kenichi Matsuno 1981 10 p refs In JAPANESE; ENGLISH summary
(NAL-TR-655; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The numerical accuracy of a predictor corrector form of the Crank-Nicolson scheme for solving boundary layer equations was investigated. A predictor corrector form of the Crank-Nicolson Scheme, based on a coupled algorithm for the continuity and the momentum equations, is presented for both the incompressible and the compressible flows. This scheme was subjected to a computer experiment by use of the problem of the laminar boundary layer development in a linearly retarded edge velocity field, and compared with another coupled scheme. It is shown that the present scheme posesses second-order accuracy and is very efficient. M.G.

N82-11827# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Civil Engineering.
A TWO-STEP APPROACH TO FINITE ELEMENT ORDERING
Steven J. Fenves and Kincho H. Law Aug. 1981 46 p refs (Contract N00014-76-C-0354)
(AD-A104320; R-81-130) Avail: NTIS HC A03/MF A01 CSCL 12/1

A two-step approach to finite element ordering is introduced. The scheme involves ordering of the finite elements first, based on their adjacency, followed by a local numbering of the nodal variables. The ordering of the elements is performed by the Cuthill-Mckee algorithm. This approach takes into consideration the underlying structure of the finite element mesh, and may be regarded as a natural finite element ordering scheme. The experimental results show that this two-step scheme is more efficient than the reverse Cuthili-McKee algorithm applied directly to the nodes, in terms of both execution time and the number of fill-in entries, particularly when higher order finite elements are used. In addition to its efficiency, the two-step approach increases modularity and flexibility in finite element programs, and possesses potential application to a number of finite element solution methods. Author (GRA)

N82-11828# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
A GENERAL MOMENT INEQUALITY FOR THE MAXIMUM OF RECTANGULAR PARTIAL SUMS OF MULTIPLE SERIES
F. Moricz (Szeged Univ., Hungary) May 1981 10 p refs (Contract N00014-79-C-0801)
(AD-A104475; TR-430; TR-81-3-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

In a recent paper (7) we presented a general method of how to obtain an upper estimate for a fixed moment of the maximum of partial sums of a single series in terms of the given 'a priori' upper estimate for the same moment of the partial sums. Now we extend this method from single series to multiple series. GRA

N82-11829# Maryland Univ. Baltimore County, Catonsville.
BOUNDARY OBSERVABILITY AND CONTROLLABILITY FOR DIFFUSION EQUATIONS Final Report, 10 Dec. 1976 - 30 Jun. 1980
Thomas I. Seidman Sep. 1981 15 p refs (Grant DAAG29-77-G-0061)
(AD-A104293; ARO-14092.20-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

Investigation has focused on problems of observation and control for parabolic equations, primarily with interaction limited to the boundary of the region. Abstracts and bibliography presented herein may be classified under six headings: (a) Basic theoretical questions on control of parabolic equations; (b) Problems of observation and identification for parabolic equations; (c) Other system-theoretic problems; (d) Problems and considerations (algorithms, regularity, etc.) related to approximation and numerical computation; (e) Ill-posed problems; and (f) Problems involving nonlinear partial differential equations. Author (GRA)

N82-11830# Naval Postgraduate School, Monterey, Calif.
CONSTRAINED ADAPTIVE LEAST MEAN SQUARED FILTERS M.S. Thesis
Michael H. Davis Jun. 1981 130 p refs
(AD-A104625) Avail: NTIS HC A07/MF A01 CSCL 12/1

The possibility of designing constrained adaptive finite impulse response digital filters is investigated as motivated by a study of adaptive noise cancellation. The first constraint considered consists of a fixed angle between filter zeros and is implemented in a master-slave approach in which one of the zeros is adjusted adaptively and the others follow subject to the constraint. The second constraint considered is a linear constraint on the filter weights and is implemented by augmenting the error equation with Legrangian multipliers. Simulations indicate that the approach is feasible. Author (GRA)

N82-11831# Ballistic Research Labs., Aberdeen Proving Ground, Md.
NUMERICAL DIFFERENTIATION OF NOISY DATA Final Report
C. Masaitis and G. Francis Aug. 1981 62 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A104631; ARBRL-MR-03126) Avail: NTIS HC A04/MF A01 CSCL 12/1

An algorithm has been developed based on the assumption that a given set of data is representable by a function that is a product of algebraic, trigonometric, and exponential polynomials. The degrees of the underlying polynomials, the optimal data spacing (optimal multiple of stepsize in tabular data), and the parameters of the approximating function are all selected by the algorithm to minimize an objective function that depends on the variance of the deviation between the data and the fitted function and on the degree of ill-conditioning of the problem. The algorithm permits choosing global or local fits. Derivatives of any order are obtained either by differentiating the fitted function or by a closed form relation between te model parameters and coefficients of linear combinations that express derivatives in terms of the observed values of the variable. Thus, the algorithm provides local differentiation formulas using parameters derived from global analysis of the data but in terms of the local values of the function. An appendix compares the accuracy of derivatives obtained for synthetic data with the accuracy of other methods.
Author (GRA)

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-11832 Illinois Univ. at Chicago Circle, Chicago.
ON PERMANENTS AND DIAGONAL PRODUCTS OF DOUBLY STOCHASTIC MATRICES Ph.D. Thesis
Ravindra Bhalchandra Bapat 1981 45 p
Avail: Univ. Microfilms Order No. 8120557

The duality theorem of linear programming is used to study the diagonal products of nonnegative matrices. It is shown that if the diagonal products of a nonnegative matrix are all bounded above by a known constant, then the entries of the matrix themselves must be bounded in a certain sense. As an application it is shown that if there are two distinct doubly stochastic matrices then there must be a diagonal product of the first which exceeds the corresponding product of the other. If A is an n x n nonnegative matrix with per A > 0, denote by f(A) the n x n matrix with f sub iJ (A) equal to a sub iJ/per A. A sub iJ is the submatrix of A obtained by deleting its i-TH row and J-TH column. A toplogical argument is used to show that f maps the set of doubly stochastic matrices as well as certain subpolytops of it onto themselves. Certain analogues of this are proved. It is shown that J sub N, the n x n matrix with all entries equal to 1/n, is the only positive fixed pont of f if n < or = 5. For n > 5 result remains unproved. A certain generalization of the above conjecture is proposed and proved for n < or = 5. It is shown that J sub N is an isolated fixed point of f.
Dissert. Abstr.

N82-11833*# Myers (Raymond H.), Blacksburg, Va.
METHODS FOR PRESENTATION AND DISPLAY OF MULTIVARIATE DATA
Raymond H. Myers Sep. 1981 18 p ref
(NASA Order L-72497-A)
(NASA-CR-165788) Avail: NTIS HC A02/MF A01 CSCL 12A

Methods for the presentation and display of multivariate data are discussed with emphasis placed on the multivariate analysis of variance problems and the Hotelling T(2) solution in the two-sample case. The methods utilize the concepts of stepwise discrimination analysis and the computation of partial correlation coefficients.
R.J.F.

N82-11834*# Myers (Raymond H.), Blacksburg, Va.
APPLICATIONS OF NON-PARAMETRIC STATISTICS AND ANALYSIS OF VARIANCE ON SAMPLE VARIANCES
Raymond H. Myers Sep. 1981 98 p
(NASA Order L-72497-A)
(NASA-CR-165789) Avail: NTIS HC A05/MF A01 CSCL 12A

Nonparametric methods that are available for NASA-type applications are discussed. An attempt will be made here to survey what can be used, to attempt recommendations as to when each would be applicable, and to compare the methods, when possible, with the usual normal-theory procedures that are available for the Gaussian analog. It is important here to point out the hypotheses that are being tested, the assumptions that are being made, and limitations of the nonparametric procedures. The appropriateness of doing analysis of variance on sample variances are also discussed and studied. This procedure is followed in several NASA simulation projects. On the surface this would appear to be reasonably sound procedure. However, difficulties involved center around the normality problem and the basic homogeneous variance assumption that is mase in usual analysis of variance problems. These difficulties discussed and guidelines given for using the methods.
Author

N82-11835# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
GENERALIZED L-, M- AND R-STATISTICS
Robert J. Serfling Aug. 1981 12 p refs
(Contract N00014-79-C-0801)
(AD-A104480; TR-349; TR-81-8-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

A class of statistics generalizing U-statistics and L-statistics, and containing other varieties of statistics as well, such as trimmed U-statistics, is studied. Using the differentiable statistical function approach, differential approximations are obtained and the influence curves of these generalized L-statistics are derived. These results are employed to establish asymptotic normality for such statistics. Parallel generalizations of M- and R-statistics are noted. Strong convergence, Berry-Esseen rates, and computational aspects are discussed.
GRA

N82-11836# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
A NOTE ON A NONPARAMETRIC MAXIMUM PENALIZED LIKELIHOOD ESTIMATOR OF THE PROBABILITY DENSITY FUNCTION OF A POSITIVE RANDOM VARIABLE. AMPLE WITH POSITIVE SUPPORT
V. K. Klonias Apr. 1981 9 p refs
(Contract N00014-79-C-0801)
(AD-A104476; TR-337; TR-81-2-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The 'first nonparametric maximum penalized likelihood density estimator of Good and Gaskins', corresponding to a penalty proportional to the Fisher information, is derived in the case that the density function has its support on the half-line. The computational feasibility as well as the consistency properties of the estimator are indicated.
Author (GRA)

N82-11837# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.
AN UPPER BOUND ON THE PROBABILITY DENSITY FUNCTION IN TERMS OF FISHER INFORMATION. A BOUND TO THE DENSITY FUNCTION
V. K. Klonias Apr. 1981 9 p refs
(Contract N00014-79-C-0801)
(AD-A104474; TR-336; TR-81-1-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

An inequality for members of a Sobolev space of order one is demonstrated and as a corollary an upper bound, in terms of the Fisher information, is derived for a density function. Also two characterizations of the Laplace and the exponential distribution are indicated.
Author (GRA)

N82-11838# Naval Research Lab., Washington, D. C. Space Systems Div.
VALIDATION OF A MONTE CARLO SIMULATION OF BINARY TIME SERIES Final Report
R. E. Johnson (Army Concepts Analysis Agency, Bethesda, Md.), H. L. Wiener, and D. Roque 18 Sep. 1981 19 p refs
(RR0140241)
(AD-A104525; NRL-8517) Avail: NTIS HC A02/MF A01

CSCL 12/1

This report presents a statistical technique appropriate for the validation of a Monte Carlo simulation of a detection process whose results can be reduced to a finite time sequence of equally spaced events with dichotomous outcomes. The technique may be applied to other similar processes where there is not stationarity or steady state in the behavior of the process simulated. It is particularly useful in the case where multiple replications of the simulation have been obtained but only one observation of the real-world process is available. The Bahadur-Lazarsfeld representation of the probability distribution of the population consisting of all binary vectors having a given number of elements is generated from the sample of such vectors produced by several independent replications of the Monte Carlo simulation. Then the validity of the simulation is determined to within a specified significance level, by comparison with a single realization of the actual process simulated. This validation technique admits correlation between events occurring at different times.

Author (GRA)

N82-11839# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.

PROPERTIES OF BATCH MEANS FROM STATIONARY ARMA (1, 1) TIME SERIES

Bruce Schmeiser and Keebom Kang Aug. 1981 19 p refs

(Contract N00014-79-C-0832; NR Proj. 277236)

(AD-A104245; RM-81-3) Avail: NTIS HC A02/MF A01 CSCL 12/1

For stationary first order autoregressive and autoregressive moving average processes with normally distributed errors, the corresponding stationary process of batch means is shown to be an autoregressive moving average process. The batch means process resulting from a moving average process, however, is shown to be a moving average process. The parameters of the batch means process are closed form functions of the batch size and parameters of the original process.

GRA

N82-11840# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.

A SIMULATION ANALYSIS OF THE EFFECTIVENESS OF MARKOVIAN CONTROL AND BAYESIAN CONTROL M.S. Thesis

Soo Sup Song Jun. 1981 81 p refs

(AD-A104635) Avail: NTIS HC A05/MF A01 CSCL 12/1

Statistical cost control decisions may be based on two competing decision models. The Markovian Control model controls a process by investigating the process whenever the reported cost exceeds a fixed critical limit. The Bayesian Control model controls a process by using the reported cost to update the probability of the process being in-control and investigate the process whenever such posterior probability is less than a fixed critical value. This paper compares the relative effectiveness of the two models by a simulation analysis. It is observed that the Markovian Control model performs as well as or better than the Bayesian Control model unless the cost distribution of the in-control state is more dispersed than that of the out-of-control state. It is also observed that the relative effectiveness of the Markovian Control model compared to the Bayesian Control increases as the savings from an investigation increases when the cost distribution of the in-control state is less dispersed than that of the out-of-control state.

Author (GRA)

N82-11841# Oak Ridge National Lab., Tenn. Mathematics and Statistics Research Dept.

ESTIMATION PROBLEMS ASSOCIATED WITH THE WEIBULL DISTRIBUTION

K. O. Bowman and L. R. Shenton (Georgia Univ., Athens) Sep. 1981 125 p refs

(Contract W-7405-eng-26)

(DE81-030466; ORNL/CSD-79) Avail: NTIS HC A06/MF A01

Series in descending powers of the sample size are developed for the moments of the coefficient of variation v(*) for the Weibull distribution F(t) = 1 -exp(- (t/b) sup c). A similar series for the moments of the estimator c(*) of the shape parameter c are derived from these. Comparisons are made with basic asymptotic assessments for the means and variances. From the first four moments, approximations are given to the distribution of v(*) and c(*). In addition, an almost unbiased estimator of c is given when a sample is provided with the value of v(*). Comments are given on the validity of the asymptotically normal assessments of the distributions.

DOE

N82-11842# Stanford Linear Accelerator Center, Calif.

PROJECTION PURSUIT METHODS FOR DATA ANALYSIS

Jerome H. Friedman and Warner Stuetzle Jun. 1981 24 p refs

(Contract DE-AC03-76SF-00515)

(DE81-027493; SLAC-PUB-2768) Avail: NTIS HC A02/MF A01

The detection and description of multivariate structure using projection of the data is described. It is noted that projection of the data generally implies loss of information. As a consequence, multivariate structure does not usually show up in all projections, and no single projection might contain all the information. It is therefore important to judiciously choose the set of projections on which the model of the structure is to be based.

DOE

N82-11299*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CLOSED FORM EVALUATION OF SYMMETRIC TWO-SIDED COMPLEX INTEGRALS

R. Winkelstein *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 133-141 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 12A

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-11843# Chicago Univ., Ill. Center for Decision Research.

PREDICTION, DIAGNOSIS, AND CAUSAL THINKING IN FORECASTING Interim Technical Report

Hillel J. Einhorn and Robin M. Hogarth 3 Sep. 1981 40 p refs Submitted for publication

(Contract N00014-18-K-0314; NR Proj. 197-071)

(AD-A104372) Avail: NTIS HC A03/MF A01 CSCL 05/10

While forecasting involves forward/predictive thinking, it depends crucially on prior diagnosis for suggesting a model of the phenomenon, for defining 'relevant' variables, and for evaluating forecast accuracy via the model. The nature of diagnostic thinking is examined with respect to these activities. We first consider the difficulties of evaluating forecast accuracy without a causal model of what generates outcomes. We then discuss the development of models by considering how attention is directed to variables via analogy and metaphor as well as by what is unusual or abnormal. The causal relevance of variables is then assessed by reference to probabilistic signs called 'cues to casuality'. These are: temporal order, constant conjunction, contiguity in time and space, number of alternative explanations, similarity, predictive validity, and robustness. The probabilistic nature of the cues is emphasized by discussing the concept of spurious correlation and how causation does not necessarily imply correlation. Implications for improving forecasting are considered with respect to the above issues.

Author (GRA)

N82-11844# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

PROJECTED NEWTON METHODS AND OPTIMIZATION OF MULTICOMMODITY FLOWS

Dimitri P. Bertsekas and Eli M. Gafni Aug. 1981 30 p refs

(Contract N00014-75-C-1183; Grant NSF ECS-79-20834; NR Proj. 049-383)

(AD-A104419; LIDS-P-1140) Avail: NTIS HC A03/MF A01 CSCL 12/2

A superlinearly convergent Newton-like method for linearly constrained optimization problems is adapted for solution of multicommodity network flow problems of the type arising in communication and transportation networks. We show that the method can be implemented approximately by making use of conjugate gradient iterations without the need to compute

explicitly the Hessian matrix. Preliminary computational results suggest that this type of method is capable of yielding highly accurate solutions of nonlinear multicommodity flow problems far more efficiently than any of the methods available at present. Author (GRA)

N82-11845# Oak Ridge National Lab., Tenn. Engineering Physics Div.
SENSITIVITY THEORY FOR NONLINEAR SYSTEMS. 2: EXTENSIONS TO ADDITIONAL CLASSES OF RESPONSES
Dan G. Cacuci Aug. 1981 37 p refs Sponsored in part by Electric Power Research Inst.
(Contract W-7405-eng-26)
(DE81-030258; ORNL/TM-7511; EPRI-RP-1441-1; EPRI-NP-81-10-LD) Avail: NTIS HC A03/MF A01

A functional analytic formulation of sensitivity theory is extended to include treatment of additional types of responses. There are physical systems where a critical point of a function that depends on the system's state vector and parameters defines the location in phase space where the response functional is evaluated. The Gateaux-differentials giving the sensitivities of both the functional and the critical point to changes in the system's parameters are obtained by alternative formalisms. The forward sensitivity formalism is the simpler and more general, but may be prohibitively expensive for problems with large data bases. The adjoint sensitivity formalism, although less generally applicable and requiring several adjoint calculations, is likely to be the only practical approach. Sensitivity theory is also extended to include treatment of general operators, acting on the system's state vector and parameters, as responses. DOE

N82-11846# Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev. Energy Measurements Group.
ENGINEERING ANALYSIS SYSTEM (EASY)
Steven D. Rebentisch 4 Jul. 1981 68 p refs
(DE81-027508; EGG-1183-1804) Avail: NTIS HC A04/MF A01

The software for the Engineering Analysis System (EASY) is described. Operating instructions for sub-systems are included. The EASY system was originally set up for the purpose of calibrating and keeping track of the transducer inventory. Its capabilities have grown to include the channel listings. These capabilities have increased the amount of software on this system by more than double the original design. The EASY system is linked directly to the processor in Los Alamos (WX-10) and the Fronr End Systems (trailers) in the forward area. The EASY computer is a PDP 11/34 running on an RSX-11M operating system. DOE

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-11847 Nebraska Univ. - Lincoln.
VECTOR INTEGRALS AND PRODUCTS OF VECTOR MEASURES Ph.D. Thesis
Sastry A. Sivasankara 1981 105 p
Avail: Univ. Microfilms Order No. 8122603

The existence of the product of two LCTVS-Valued (countably additive) measures in various cases was proved. The product was expressed as an 'integral', as in the classical case of nonnegative measures. T.M.

N82-11848 Vanderbilt Univ., Nashville, Tenn.
HOMEOMORPHISMS OF SOME DIRECT LIMIT SPACES Ph.D. Thesis
Margaret Anne Hale 1981 111 p
Avail: Univ. Microfilms Order No. 8120200

The topology of some infinite dimensional direct limit spaces is investigated. The closed, locally compact subsets of a connected F-manifold are precisely the closed metrizable subsets. In addition, among the closed subsets of an F-manifold, first countability is equivalent to metrizability. Let H(M) denote the homeomorphism group of an F-manifold M. It is shown that in the limitation topology, the path components of H(M) are points. We prove here that in compact-open topology, H(M) is regular, Lindelof, paracompact, F-stable, and non-first countable. (These properties are shared by M.) We further show that, unlike M, H(M) with this topology is not a k-space. Homeomorphisms of a space onto itself are studied through group actions. Group actions are used to develop a factoring technique for homeomorphism groups. Dissert. Abstr.

N82-11849 Cornell Univ., Ithaca, N. Y.
RECURSIVE ASPECTS OF THE THEORY OF REAL CLOSED FIELDS Ph.D. Thesis
Stephen Brady 1981 50 p
Avail: Univ. Microfilms Order No. 8119493

The classical Artin-Schreier theory of real closed fields is reviewed for effective content. The main existence theorems of that theory are translated into effective forms and proven either true or false. The structure of real closed extensions of recursively ordered fields is then investigated, and theorems analogous to those of Melakides and Nerode for the algebraic case are proved. In addition, some of the limitations on the intrinsic relationships between recursively presented fields and their extensions or subfields are considered. The question of the conditions under which there must be a recursively presented real closed field lying between a recursively presented, formally real field and any presentation of its algebraic closure is addressed. This leads to a number of examples which illustrate the relationship between a formally real field's having a splitting algorithm and having certain spaces of orderings. Dissert. Abstr.

N82-11850 Illinois Univ. at Chicago Circle, Chicago.
LINEAR EVOLUTION EQUATIONS OF HYPERBOLIC TYPE IN A LOCALLY CONVEX SPACE PH.D. Thesis
Young Han Choe 1981 92 p
Avail: Univ. Microfilms Order No. 8120562

The Cauchy problem for a linear evolution equation of hyperbolic type in a sequentially complete locally convex space X is studied. A set of sufficient conditions are sought for the operator-valued function and the vector-valued function so that the equation (L) has a unique solution and to construct the solution from given data. Various new concepts and methods are necessary for the theory of evolution equation in locally convex spaces. Calibrations, indexed calibrations and vector-valued integration are studied. Suitably chosen calibrations and indexed-calibrations replace the norms and then the corresponding expression by members of these calibrations or indexed-calibrations are obtained. The concept of Bocher-integrals is extended to the functions whose values lie in locally convex spaces. Dissert. Abstr.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-11851# Cornell Univ., Ithaca, N. Y. Dept. of Structural Engineering.
FINITE ELEMENT ANALYSIS OF COUPLED MAGNETO-MECHANICAL PROBLEMS OF CONDUCTING PLATES Topical Report, Dec. - Apr. 1981
Kuan-Ya Yuan, Francis C. Moon, and John F. Abel 1 May 1981 17 p refs Presented at Intern. Conf. on Numerical Methods for Coupled Probl., Swansea, Wales, 7-11 Sep. 1981 Submitted for publication
(Contract N00014-79-C-0224)
(AD-A104406; Rept-81-10) Avail: NTIS HC A02/MF A01 CSCL 18/9

In design problems for fusion reactor structures and other magnetically loaded devices, the field and the magnetic forces are usually calculated for static conditions only. The structural analysis is then handled as a separate problem. Recently, more attention is being given to the transient field problems, but little work has been done in understanding the nature of the dynamic magnetic forces and the mutual interactions between the field and the structure. This paper presents a study of the magnetic forces, the mutual interaction between fields, and the induced vibrations of long conducting plates. The finite element method

is used for analysis. Some numerical results are presented.
Author (GRA)

N82-11852# California Univ., Berkeley. Lawrence Berkeley Lab.
STABILITY OF PERMANENT-MAGNET PARAMETERS
V. I. Ilyushchenko 1981 6 p refs Transl. into ENGLISH from JINR Report 9-11618 (Dubna), 1981 In ENGLISH and RUSSIAN
(Contract W-7405-eng-48)
(DE81-027013; UCRL-tr-1596) Avail: NTIS HC A02/MF A01

Data are presented on the time, temperature, and radiation-stability characteristics of permanent magnets composed of barium ferrite, ALNICO alloys, and SmCo5. Magnetic characteristics are constant over a period of 10(4) to 10(5) h. Results are given on reversible and irreversible flux losses. It is concluded that these magnetic materials have a radiation stability similar to that of aluminum and stainless steel. DOE

N82-11853# Brookhaven National Lab., Upton, N. Y. Physics Dept.
PHYSICS IN FEW DIMENSIONS
V. J. Emery Mar. 1981 10 p refs Presented at the Conf. on Non-Linear Probl.: Present and Future, Los Alamos, N. Mex., Mar. 1981
(Contract DE-AC02-76CH-00016)
(DE81-026054; BNL-29719; CONF-810385-1) Avail: NTIS HC A02/MF A01

Some aspects of physics in few dimensions are discussed and its relationship to nonlinear field theories. After a survey of materials and some of the models that are used to describe them, the various methods of solution are compared and contrasted. The roles of exact results, operator representations and the renormalization group transformation are described, and a uniform picture of the behavior of low dimensional systems is presented. DOE

N82-11854# Sandia Labs., Albuquerque, N. Mex.
CONSTITUTIVE MODELLING FOR THE SHOCK PHYSICIST
W. Herrmann 1981 14 p refs Presented at APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024063; SAND-81-1194C; CONF-810684-36) Avail: NTIS HC A02/MF A01

Despite the fact that the theory of constitutive equations is developed with constitutive equations fabricated from many ad hoc assumptions some of which may be inconsistent or implicit, and are often very restricted in the types of motion to which they are applicable. Many of these constitutive equations in fact are special cases of general constitutive theories which have been studied in detail, and for which many general properties are known. The methodology of continuum constitutive theory is reviewed, with some examples drawn from viscous, viscoelastic, viscoplastic and mixture theories which have recently been applied to describing certain features of shock wave propagation. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-11855 British Broadcasting Corp., Kingswood (England).
ACOUSTIC SCALING: A REVIEW OF PROGRESS TO DATE, AND OF POSSIBLE FUTURE DEVELOPMENT
C. D. Mathers Sep. 1981 10 p refs
(BBC-RD-1981/6) Avail: British Broadcasting Corp., Tadworth, Surrey, England

The techniques of acoustic modelling have developed to a degree which enables a realistic subjective assessment to be made of at least the major features of a music studio. The successes of the work are reviewed, its limitations are discussed, and the ways in which advancing technology might enable some of these limitations to be overcome in the future are considered. A.R.H.

N82-11856 Pennsylvania State Univ., University Park.
A NEW METHOD FOR MEASURING THE ACOUSTIC IMPEDANCE OF THE GROUND Ph.D. Thesis
Constantine Glaretas 1981 134 p
Avail: Univ. Microfilms Order No. 8120429

A method for measuring the acoustic impedance of the ground was developed. The free field two microphone method, as it is called consists of measuring the sound pressure field, radiating from a loudspeaker source and propagating parallel to the ground by two microphones located on the same vertical axis. The transfer function between these two microphone signals is shown to be, for total coherence, equal to the ratio of velocity potentials, predicted by the appropriate point to point propagation theory over a plane boundary. A numerical search with a digital computer provides the value of ground impedance which satisfies the transfer function relationship stated above. Three ground models were a locally reacting, an extended reacting, and a layered ground model. From the close agreement of local and extended reaction models in predicting ground impedance, it is concluded that the grass covered surfaces tested here can be considered as locally reacting, without significant error. Dissert. Abstr.

N82-11857 Pennsylvania State Univ., University Park.
AN EXPERIMENTAL INVESTIGATION OF OCEAN SEDIMENT EFFECTS UPON LONG RANGE TRANSMISSION LOSS IN SHALLOW WATER Ph.D. Thesis
John Harold Beebe 1981 191 p
Avail: Univ. Microfilms Order No. 8120400

Volume absorption was determined experimentally from mode attenuation coefficients measured using explosive sources at sites having varied sediment types. Absorption was predicted using the sediment models of Biot and Hamilton, and compared with the experimental absorption data. Comparisons between experimental and predicted absorption showed good agreement for three sites having medium to coarse sediments. The best agreement was obtained for a site having a mud bottom where the Biot model gave slightly better results than that of Hamilton over a frequency range of 25 to 250 Hz. Transmission loss was predicted for a site on the Scotian Shelf with a sloping bottom using values of sediment absorption predicted with the sediment models. Comparisons of transmission loss measured in one third octave bands over a frequency range of 25 to 800 Hz showed excellent agreement below 250 Hz with the loss predicted using an adiabatic normal mode propagation loss model whose sediment absorption inputs were obtained using the Biot model.
Dissert. Abstr.

N82-11858*# Bionetics Corp., Hampton, Va.
HANDBOOK FOR INDUSTRIAL NOISE CONTROL
1981 139 p refs
(Contract NAS1-15721)
(NASA-SP-5108) Avail: NTIS HC $7.50/MF A01 CSCL 20A

The basic principles of sound, measuring techniques, and instrumentation associated with general purpose noise control are discussed. Means for identifying and characterizing a noise problem so that subsequent work may provide the most efficient and cost effective solution are outlined. A methodology for choosing appropriate noise control materials and the proper implementation of control procedures is detailed. The most significant NASA sponsored contributions to the state of the art development of optimum noise control technologies are described including cases in which aeroacoustics and related research have shed some light on ways of reducing noise generation at its source. A.R.H.

N82-11859*# United Technologies Research Center, East Hartford, Conn.
HELICOPTER ROTOR TRAILING EDGE NOISE Final Report
Robert H. Schlinker and Roy K. Amier Washington NASA Nov. 1981 150 p refs
(Contract NAS1-15730)
(NASA-CR-3470) Avail: NTIS HC A07/MF A01 CSCL 20A

A two dimensional section of a helicopter main rotor blade

was tested in an acoustic wind tunnel at close to full-scale Reynolds numbers to obtain boundary layer data and acoustic data for use in developing an acoustic scaling law and testing a first principles trailing edge noise theory. Results were extended to the rotating frame coordinate system to develop a helicopter rotor trailing edge noise prediction. Comparisons of the calculated noise levels with helicopter flyover spectra demonstrate that trailing edge noise contributes significantly to the total helicopter noise spectrum at high frequencies. This noise mechanism is expected to control the minimum rotor noise. In the case of noise radiation from a local blade segment, the acoustic directivity pattern is predicted by the first principles trailing edge noise theory. Acoustic spectra are predicted by a scaling law which includes Mach number, boundary layer thickness and observer position. Spectrum shape and sound pressure level are also predicted by the first principles theory but the analysis does not predict the Strouhal value identifying the spectrum peak. A.R.H.

N82-11860*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SEL AND EPNL NOISE DURATION COEFFICIENTS FOR THE 747 AND T-38 AIRCRAFT
William L. Willshire, Jr. Sep. 1981 12 p refs
(NASA-TM-83214) Avail: NTIS HC A02/MF A01 CSCL 20A

Duration coefficient were calculated for Boeing 747 and T-38 airplanes for sound exposure level (SEL) and effective perceived noise level (EPNL) scales. The measured SEL duration coefficients were 8.4 for the Boeing 747 and 5.5 for the T-38 result was in good agreement with a previous result for a similar F-5 airplane. In EPNL, the duration coefficients were 7.2 for the Boeing 747 and 5.7 for the T-38. The difference in the results between the two airplanes is believed to be due to their different engine noise source spectra. The difference in the Boeing 747 results in the two different metric was due to the different frequency weighting of A-weighted sound pressure level, used in SEL, and tone-corrected perceived noise level, used in EPNL, when applied to the 747 spectra. B.W.

N82-11861*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SYSTEM FOR CONTROLLED ACOUSTIC ROTATION OF OBJECTS Patent Application
Martin B. Barmatz, Inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 18 Sep. 1981 15 p
(Contract NAS7-100)
(NASA-Case-NPO-15522-1; US-Patent-Appl-SN-303672) Avail: NTIS HC A02/MF A01 CSCL 20A

A system is described for use with acoustically levitated objects, which enables close control of rotation of the object. One system includes transducers that propagate acoustic waves along the three dimensions (X, Y, Z) of a chamber of rectangular cross section. Each transducer generates a first wave which is resonant to a corresponding chamber dimension to acoustically levitate an object, and additional higher frequency resonant wavelengths for controlling rotation of the object. The three chamber dimensions and the corresponding three levitation modes (resonant wavelengths) are all different, to avoid degeneracy, or interference, of waves with one another, that could have an effect on object rotation. Only the higher frequencies, with pairs of them having the same wavelength, are utilized to control rotation, so that rotation is controlled independently of levitation and about any arbitrarily chosen axis. NASA

N82-11862*# Intergraph Corp., Huntsville, Ala.
DIGITAL ULTRASONICS SIGNAL PROCESSING: FLAW DATA POST PROCESSING USE AND DESCRIPTION Final Report
Victor E. Buel 30 Sep. 1981 141 p
(Contract NAS8-33100)
(NASA-CR-161882) Avail: NTIS HC A07/MF A01 CSCL 20A

A modular system composed of two sets of tasks which interprets the flaw data and alows compensation of the data due to transducer characteristics is described. The hardware configuration consists of two main units. A DEC LSI-11 processor running under the RT-11 sngle job, version 2C-02 operating system, controls the scanner hardware and the ultrasonic unit. A DEC PDP-11/45 processor also running under the RT-11, version 2C-02, operating system, stores, processes and displays the flaw data. The software developed the Ultrasonics Evaluation System, is divided into two catagories: transducer characterization and flaw classification. Each category is divided further into two functional tasks: a data acquisition and a postprocessor ask. The flaw characterization collects data, compresses its, and writes it to a disk file. The data is then processed by the flaw classification postprocessing task. The use and operation of a flaw data postprocessor is described. S.L.

N82-11863# Mississippi Univ., University. Dept. of Physics and Astronomy.
ACOUSTIC CAVITATION STUDIES Final Report
Lawrence A. Crum 1 Sep. 1981 23 p refs
(Contract N00014-79-C-0404)
(AD-A104409; Rept-811) Avail: NTIS HC A02/MF A01 CSCL 13/10

The primary thrust of this study was toward a more complete understanding of general aspects of acoustic cavitation. The effect of long-chain polymer additives on the cavitation threshold was investigated to determine if they reduced the acoustic cavitation threshold in a similar manner to the observed reduction in the cavitation index in hydrodynamic cavitation. Measurements were made of the acoustic cavitation threshold as a function of polymer concentration for additives such as guar gum and polyethelene oxide. The measurements were also made as a function of dissolved gas concentration, surface tension and viscosity. It was determined that there was a significant increase in the acoustic cavitation threshold for increased concentrations of the polymer additives (measurable effects could be obtained for concentrations as low as a few parts per million). One would normally expect that an additive that reduces surface tension to decrease the pressure required to cause a cavity to grow and thus these additives, at first thought, should reduce the threshold. However, even in the hydrodynamic case, the threshold was increased. In both of the hydrodynamic cases considered, the explanation for the increased threshold was given in terms of changed fluid dynamics rather than changed physical properties of the fluid. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-11864 Rutgers - The State Univ., New Brunswick, N. J.
IONIZATION FLUCTUATIONS IN COLLISIONAL IONIZING SHOCK WAVES Ph.D. Thesis
Lin I 1981 141 p
Avail: Univ. Microfilms Order No. 8122082

Large amplitude density fluctuations were studied in the argon plasma behind collisional ionizing shock fronts. Chaotic post-shock density fluctuations were observed. They were two dimensional, almost frozen with the post-shock fow, and had particle-like dynamical behaviors. Amplitudes were greater at the shock front and slowly damped away to reach the post-shock equilibrium. Power spectra were composed of many discrete modes and followed S(K sub z) alpha with $1.2 < \text{alpha} < 2.2$ for $71 > M > 15$. The typical fluctuation scales were in the order of 1 cm. Rayleigh-Taylor instability and hydrodynamic rotational convective turbulence fail to explain the observed phenomena. An ionization reaction diffusion turbulene model is proposed, in which post-shock chaotic patterning can be induced by the ioniztion and diffusion effect and driven by the highly ordered pre-shock gas flow. The expectations from the use of this kind of open nonequilibrium system give good qualitative agreement with the experimental results. Dissert. Abstr.

N82-11865 Cornell Univ., Ithaca, N. Y.
NONLINEAR WAVES ON CHARGED PARTICLE BEAMS Ph.D. Thesis
Thomas Patrick Hughes 1981 141 p
Avail: Univ. Microfilms Order No. 8119459

A two dimensional particle simulation of the resistive filamentation instability on a charge and current neutralized particle

beam was performed. The nonlinear development of the instability is analyzed with reference to the focusing requirements of heavy ion beams acting as drivers for pellet fusion. It is found that magnetically pinched current filaments form for all values of the dimensionless parameter. The combined area of the filaments decreases significantly as the filaments coalesce. This leads to a speculation that adequate focusing of the beam may be possible in spite of the development of this instability. Nonlinear space-charge waves in a strongly magnetized cylindrical plasma were also investigated. Soliton and periodic wave solutions were obtained. For the case of an intense unneutralized electron beam, a significant decrease in the phase velocity of the slow spce charge wave is found at large amplitudes. The importance of this result for some collective ion acceleration schemes is discussed. Dissert. Abstr.

N82-11866 Nebraska Univ. - Lincoln.
THE HYDROGEN ATOM IN A STRONG UNIFORM MAGNETIC FIELD Ph.D. Thesis
Gary Leigh Webster 1981 122 p
Avail: Univ. Microfilms Order No. 8122605

The wave function for an electron in combined Coulomb and uniform magnetic fields is expanded in oblate speroidal angle functions. The resulting Schodinger equation for the racial functions is solved in two regions of energy and magnetic field strength. First, for large astrophysical field strengths, two adiabatic methods are employed which yield rigorous upper and lower bounds on the lowest exact energy levels for each symmetry of the system. Results are presented for energies of hydrogenic Is and 2p levels in magnetic fields in the range 10 to the 7th power < or = B < or = 10 to the 11th power Gauss. These results indicate that the present adiabatic methods employing spherical symmetry may be expected to give reliable results for energies of low lying hydrogenic levels for magnetic fields in the range 0 < or = B < or = 10 to the 9th power G. Second, these adiabatic methods are used. to obtain basis states for a calculation including nonadiabatic coupling. Properties of the oblate spheroidal eigenvalues and angle functions are presented, as are the properties of the matrix elements that couple the adiabatic channels. Dissert. Abstr.

N82-11867 Harvard Univ., Cambridge, Mass.
MOLECULAR SPECTROSCOPY AND RELAXATION IN SUPERSONIC BEAMS Ph.D. Thesis
Katherine Lynn Saenger 1981 156 p
Avail: Univ. Microfilms Order No. 8120554

The results of laser induced fluorescence studies which explore various aspects of relaxation and spectroscopy in supersonic molecular beams are reported. The blue shifted absorption band in I2-solvent complexes formed in a supersonic expansion and the rotational and vibrational temperature of I2 as a function of pressure and diluent gas are examined. The utility of 12 fluorescence as a diagnostic to characterize the shape and cooling profile of the gas pulses is demonstrated for a pulsed nozzle. The electron spectrum of jet cooled biacetyl-d6 and the red bands in the electronic spectrum of biacetyl-h6 are also reported. Dissert. Abstr.

N82-11868 Cornell Univ., Ithaca, N. Y.
DIRECT OBSERVATION OF EXCITED OXYGEN ATOM PRODUCTION AND DEACTIVATION Ph.D. Thesis
Alan Peter Force 1981 160 p
Avail: Univ. Microfilms Order No. 8110418

The photodissociation of O3 in the gas phase at 248 nm was studied following photolysis with a KrF excimer laser. Oxygen atoms in the ground O(3Pj) state were detected through the use of time resolved atomic resonance absorption spectroscopy. The production of the ground state oxygen atoms in the photolysis process was monitored photoelectrically by their absorbance of the rsonance triplet at 130 nm, produsea in a microwave powered atomic resonance lamp. Optically metastable O(1D2) atoms were monitored by following the increase in O(3Pj) concentration following deactivation of O(1D2) by O3. A comparison of the yield of O(3Pj) following O(1D2) deactivation by O3 and N2 shows that the rmoval of one excited oxygen atom is associated with the production of one ground state atom (1.05 + or - 0.05), suggesting the possible importance of physical quenching and concommitant energy transfer in the deactivation process. A quantitative estimate of the quantum yield of O(1D2) production at 248 nm of 0.85 + or - 0.02 can be made from the relative yields of O(1D2) and O(3Pj). Dissert. Abstr.

N82-11869 Iowa State Univ. of Science and Technology, Ames.
AN ELECTROSTATIC MODEL FOR ENERGIES OF MOLECULES IN SOLUTION Ph.D. Thesis
Clifford Eric Felder 1981 118 p
Avail: Univ. Microfilms Order No. 8122511

A model for solute solvent interactions is considered, in which the solute molecule is placed in a cavity surrounded by a dielectric. Each atom of the solute molecule is assigned a polarizability and a fixed partial chage, determined by semiempirical methods. These charges induce dipole moments at the atoms and polarize the dielectric. Each induced dipole is calculated by a rigorous treatment of its interactions with the charges and dipoles of the other atoms and with the dielectric. The electrostatic free energy for the molecule is determined as the reversible work to polarize the atoms and the surrounding dielectric and to assemble the charges and induced dipoles in their final positions within the cavity. In turn, molecular dipole moments and free energies of proton and electron transfer among related molecules may be calculated. Explicit formulas are derived for the case of a spherical cavity. Dissert. Abstr.

N82-11870# Boston Coll., Chestnut Hill, Mass. Dept. of Physics.
PARTICLE TRAJECTORIES IN A MODEL ELECTRIC FIELD 1
Yaakov Shima, Gabor Kalman, and Paul Carini 5 Jun. 1981 16 p
(Contract F19628-79-C-0031; AF Proj. 7661)
(AD-A104507; SCIENTIFIC-1; AFGL-TR-81-0167) Avail: NTIS HC A02/MF A01 CSCL 20/8

The work reported in this note was done for the purpose of determining the feasibility of neutralizing the potential difference that occurs on a spacecraft. It has been proposed that neutralization can be accomplished by emitting ions from the positively charged surface region of the spacecraft and by letting this current impact on the negatively charged surface region. In order to investigate the main features of the proposed scheme, we made some simplifying assumptions about the geometry of the problem. GRA

N82-11871# Naval Research Lab., Washington, D. C.
ON ELECTRON BEAM IONIZATION OF AIR AND CHEMICAL REACTIONS FOR DISTURBED AIR DEIONIZATION Interim Report
A. W. Ali 22 Sep. 1981 43 p refs
(AD-A104517; NRL-MR-4619) Avail: NTIS HC A03/MF A01 CSCL 20/7

An overview of the electron beam ionization and deionization of the dry and wet air is presented. Ionization calculation schemes are discussed and the pertinent reaction rates for the relaxation of disturbed air are reviewed. The review gives the magnitudes and the temperature range over which the coefficients are measured. Recommendations are made to extend rate coefficient measurements to higher temperatures for some specific reactions. Author (GRA)

N82-11872# California Univ., Berkeley. Lawrence Berkeley Lab.
MOLECULAR-BEAM SYSTEM FOR THE STUDY OF TRANSIENT COMBUSTION PROCESSES
F. C. Hurlbut, A. K. Oppenheim, P. Coico, and R. Peterson Aug. 1981 39 p refs
(Contract W-7405-eng-48)
(DE81-030663; LBL-13178) Avail: NTIS HC A03/MF A01

Construction of a direct sampling molecular beam apparatus for the measurement of concentration histories of short-lived species, in particular active radicals serving as chain carriers in the course of ignition in a hdrocarbon-air mixture, is described, including some prominent features of its design analysis. Whereas the system is not yet finished in all peripheral details, central elements have reached a sufficient degree of completion and level of function to warrant its documentation in the form of a preliminary report, incorporating the results of preliminary performance evaluation. The latter includes the measurement of

the shutter function, showing the modulation of the beam monitored by a chopper to check its quality, and a time of arrival record from which it was established that the beam is fully supersonic at a Mach number of 2.34. DOE

N82-11873# California Univ., Livermore. Lawrence Livermore Lab.
USE OF MOLECULAR BEAMS TO SUPPORT MICROSPHERES DURING PLASMA COATING
J. K. Crane, R. D. Smith, W. L. Johnson, C. W. Jordan, S. A. Letts, G. R. Korbel, and R. M. Krenik 26 Aug. 1980 20 p refs Presented at the Am. Vac. Soc. Conf., Detroit, 13 Oct. 1980
(Contract W-7405-eng-48)
(DE81-025601; UCRL-84488-Rev-1; CONF-801037-9-Rev-1) Avail: NTIS HC A02/MF A01

Spherical targets can be levitated on beams of Ar or other gas atoms. This is an especially useful technique for supporting microspheres during plasma coating and processing. Measurements of gas flow and pressure indicate that the levitation device operates in the regime of Knudsen's flow. This device is currently being used in the development of future generation laser targets. DOE

N82-11874# Brookhaven National Lab., Upton, N. Y.
WORKSHOP ON ATOMIC PHYSICS AT THE NATIONAL SYNCHROTRON LIGHT SOURCE
K. W. Jones, ed., B. M. Johnson, ed., and D. C. Gregory, ed. Jan. 1981 210 p refs Workshop held at Upton, N.Y., 15-17 Sep. 1980
(Contract DE-AC02-76CH-00016)
(DE81-023507; BNL-28832; CONF-8009157) Avail: NTIS HC A10/MF A01

The range of experimental capabilities of the national synchrotron light source includes applications in photoelectron spectroscopy, photon scattering, X-ray absorption spectroscopy, time resolved measurements, resonance spectroscopy, and threshold excitation. The photoionization of excited states, ions, and open shell atoms; atomic structure and electron correlations; and photoelectron spectroscopy and photoionization experiments on atoms and free molecules (gases) are discussed. A.R.H.

N82-11875# Brookhaven National Lab., Upton, N. Y.
USE OF MICROPROCESSORS IN A NEUTRINO EXPERIMENT
P. L. Connolly and D. Cutts (Brown Univ., Providence, R.I.) 1981 6 p Presented at the Conf. on the Appl. of Microprocessors to High Energy Phys. Expt., Geneva, 4-6 May 1981
(Contract DE-AC02-76CH-00016)
(DE81-026057; BNL-29675; CONF-810539-8) Avail: NTIS HC A02/MF A01

A fundamental part of the neutrino detector, four DEC LSI-11s are interfaced each to 1/4 of the detector apparatus via programmable scan controllers and to the central DEC 11-34 via separate DMA links. These microprocessors act in parallel to collect and reformat data from neutrino events; further, they can act independently, orchestrating an elaborate variety of calibrations asynchronously in different regions of the apparatus. It is much easier to manage a large detector in separate pieces. Each LSI-11 can run in stand-alone mode, allowing independent installation or checkout of different parts of the detector. When operational, the apparatus must be continuously calibrated; with a very large number of separate detector elements, distributed intelligence is most useful. DOE

N82-11876# Rensselaer Polytechnic Inst., Troy, N. Y.
MECHANISTIC ANALYSIS OF LOFT PULSED NEUTRON ACTIVATION DATA
M. L. Perez-Griffo, R. C. Block, and R. T. Lahey, Jr. 1981 7 p refs Presented at the 1981 Ann. Meeting of the Am. Nucl. Soc., Miami Beach, Fla., 7-12 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-027124; CONF-810606-84) Avail: NTIS HC A02/MF A01

A technique for measuring mass weighted flow velocities without perturbing the flow is described. Monte Carlo PNA tagging and Monte Carlo detection calculations of the irradiated fluid with the transport of the irradiated fluid are used to predict the time spectrum in a PNA measurement. This mechanistic method is used to analyze recent LOFT PNA measurements of single phase water flowing in a 14 in. (0.35 m) schedule 160 steel pipe. DOE

N82-11877# California Univ., Berkeley. Lawrence Berkeley Lab. Physics, Computer Science and Mathematics Div.
ELASTIC AND INELASTIC PSI PRODUCTION BY MUONS
Stewart C. Loken Jun. 1981 10 p refs Presented at 16th Rencontre de Moriond, Elementary Particle Phys. Meetings, Les Arcs, France, 15-27 Mar. 1981
(Contract W-7405-eng-48)
(DE81-025326; LBL-12814) Avail: NTIS HC A02/MF A01

Results are presented on the elastic and inelastic production of psi(3.1). The elastic data are qualitative agreement with the predictions of photo-gluon fusion but have a steeper dependence on sq Q than the model predicts. A QCD calculation accounts well for the shape of the inelastic data in inelasticity, sq A and E/sub gamma/, but fails to account for the absolute cross section. At 209 GeV, the cross-section for elastic psi production is 0.36 + or - 0.07 nb; for inelastic 0.28 + or - 0.06 nb. DOE

N82-11878# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
PROTON INDUCTION LINACS AS HIGH-INTENSITY NEUTRON SOURCES
Denis Keefe and Egon Hoyer Jun. 1981 12 p refs Presented at the 5th meeting of the Intern. Collaboration and Advanced Neutron Sources, Julich, West Germany, 22-26 Jun. 1981
(Contract W-7405-eng-48)
(DE81-025825; LBL-12855) Avail: NTIS HC A02/MF A01

Proton induction linacs were explored as high intensity neutron sources. The induction linac and its limitations for accelerating ions were reviewed. A number of proton induction linac designs were examined and general conclusions were given. Results suggest that a proton induction accelerator of the lowest voltage, consistent with good neutron flux, is preferred and could well be cost competitive with the usual RF linac/storage ring designs. DOE

N82-11879# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
REACTION OF OXYGEN ATOMS WITH ETHYLENE AND VINYLBROMIDE
Richard J. Buss, Robert J. Baseman, Guozhong He, and Y. T. Lee May 1981 23 p refs Presented at the 10th Intern. Conf. on Photochem., Iraklion, Crete, 6-12 Sep. 1981
(Contract W-7405-eng-48)
(DE81-025206; LBL-12801) Avail: NTIS HC A02/MF A01

Identification of the primary products in the reaction of O(3P) atoms with ethylene and vinyl bromide was accomplished by measurement of the angular and velocity distributions of the products in a crossed beam apparatus under single collision conditions. The atomic elimination processes are found to be the major channels while molecular elimination is not observed. The 1,2 migration of H atom in the intermediate complex is not observed to occur. DOE

N82-11880# California Univ., Livermore. Lawrence Livermore Lab.
STATISTICAL VERSUS VALENCE NEUTRON NEUTRON CAPTURE IN Mo-98
D. G. Gardner 19 Jun. 1981 5 p refs Presented at 4th Intern. Symp. on Neutron-Capture-Gamma-Ray Spectry. and Related Topics, Grenoble, 7-11 Sep. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE81-023943; UCRL-86267; CONF-810920-1) Avail: NTIS HC A02/MF A01

In mass regions corresponding to peaks in the neutron strength function, nonstatistical mechanisms contribute a significant or even major portion of the average radiation width in the beginning of the resonance region. This could severely limit the possibility of calculating capture cross sections for targets where experimental data are lacking, because such direct effects are sensitive to the detailed nuclear level structure in the daughter nucleus. The reaction Mo-98 +n was examined for neutrons in the 1 keV to 3 MeV energy range, because this case is often cited as one of

the clearest examples of valence neutron capture effects. Preliminary calculations are presented which suggest that these nonstatistical effects rapidly disappear when measurements from even a small number of resonances are averaged. DOE

N82-11881# Argonne National Lab., Ill.
ROLE OF EXCITED STATES OF MOLECULAR IONS IN STRUCTURE STUDIES WITH HIGH-ENERGY COLLISIONS
E. P. Kanter 1980 82 p refs Presented at NATO Intern. Advanced Study Inst. on Molecular Ions: Geometric and Electron. Structures, Kos, Greece, 30 Sep. - 10 Oct. 1980
(Contract W-31-109-eng-38)
(DE81-023898; CONF-8009131-2) Avail: NTIS HC A05/MF A01

The main features of the Coulomb explosion of fast-moving molecular-ions and the manner in which Coulomb-explosion techniques are being applied to the problem of determining stereochemical structures of light polyatomic ions are described. Examples of such experiments are presented for several ions. DOE

N82-11882# Carnegie-Mellon Univ., Pittsburgh, Pa.
DETECTION AND STUDY OF NEW HEAVY PARTICLES THROUGH JET IDENTIFICATION
John B. Babcock 1981 17 p refs Presented at Conf. on Perturbative Quantum Chromodynam., Tallahassee, Fla., 25 Mar. 1981
(Contract DE-AC02-76ER-03066)
(DE81-025151; CONF-810368-3; COO-3066-169) Avail: NTIS HC A02/MF A01

A solution to the problem of the identification of an arbitrary number of jets in high energy collisions is reviewed. Some of the applications of this solution to the study of the electroweak interactions are illustrated through two examples: the detection and analysis of top quarks, and the detection of charged Higgs or pseudo Goldstone bosons, in e(+)e(-) reactions. Although these two examples involve e(+)e(-) initial states, the jet identification method described could be used in the analysis of any reaction involving jets. DOE

N82-11883# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
BOUNDED LIMIT FOR THE MONTE CARLO POINT-FLUX-ESTIMATOR
R. A. Grimesey 1981 6 p refs Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026526; CONF-810606-78) Avail: NTIS HC A02/MF A01

In a Monte Carlo random walk the kernel K(R,E) is used as an expected value estimator at every collision for the collided flux phi sub c r vector E) at the detector point. A limiting value for the kernel is derived from a diffusion approximation for the probability current at a radius R sub 1 from the detector point. The variance of the collided flux at the detector point is thus bounded using this asymptotic form for K(R,E). The bounded point flux estimator is derived. DOE

N82-11884# Los Alamos Scientific Lab., N. Mex.
ELECTRON - TEMPERATURE REQUIREMENTS FOR NEUTRALIZED INERTIAL-CONFINEMENT-FUSION LIGHT-ION BEAMS
D. S. Lemons 1981 12 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29 Jun. - 3 Jul. 1981
(Contract W-7405-eng-36)
(DE81-025352; LA-UR-81-1873; CONF-810620-9) Avail: NTIS HC A02/MF A01

Because of their large self-space-charge fields, light ion beam drivers of energy and power sufficient to achieve inertial confinement fusion (ICF) cannot be focused on a small fuel pellet unless neutralized. Even if initially neutralized with comoving electrons, these beams will not stay neutralized and focus during propagation through a vacuum chamber unless the initial thermal-energy of the neutralizing electrons is sufficiently small. The effects which contribute to the effective initial temperature of the neutralizing electron are discussed including compressional shock heating. A simple heuristic model is used to construct envelope equations which govern axial as well as radial beam compression and use them to predict the largest initial electron temperature consistent with the required beam compression. This temperature for typical light ion beam systems is about ten eV - a temperature which may be possible to achieve. DOE

N82-11885# Los Alamos Scientific Lab., N. Mex.
IMPROVED CALCULATIONS OF ENERGY DEPOSITION FROM FAST NEUTRONS
D. J. Brenner, R. E. Prael, J. F. Dicello, and M. Zaider 1981 11 p refs Presented at 4th Symp. on Neutron Dosimetry, Neuherberg/Munich, West Germany, 1 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025385; LA-UR-81-1694; CONF-810673-2) Avail: NTIS HC A02/MF A01

A firmer basis for neutron cross-sectional calculations was established which results in improved calculations of dose and energy deposition in small sites from high energy neutrons. Secondary particle production spectra due to neutrons indicent on carbon and oxygen are calculated sing an intranuclear cascade code which takes into account specific nucler properties of carbon and oxygen (in particular, alpha-particle clustering). It also allows excited nuclei to de-excite by Fermi breakup rather than the more frequently used statistical evaporation mechanism, which is not applicable to low-mass nuclei. The code yields double-differential secondary particle spectra in energy angle which show good agreement with experimental data. DOE

N82-11886# Oak Ridge National Lab., Tenn. Solid State Div.
ION-REVERSIBILITY STUDIES IN AMORPHOUS SOLIDS USING THE TWO-ATOM SCATTERING MODEL
O. S. Oen Jun. 1981 28 p refs Presented at the Seminar of Recent Theoret. Computational Develop. in Atomic Collisions in Solids, Strasbourg, 14 Jul. 1981
(Contract W-7405-eng-26)
(DE81-025188; CONF-810732-1) Avail: NTIS HC A03/MF A01

An analytical two-atom scattering model was developed to treat the recent discovery of the enhancement near 180 of Rutherford backscattering yields from disordered solids. The model includes the interaction of a second atom lying between the target surface and the backscattering plane. The projectile ion makes a glancing collision with this second atom both before and after it is backscattered. The model predicts an enhancement effect whose physical origin arises from the tolerance of path for those ions whose inward and outward trajectories lie in the vicinity of the critical impact parameter. Results using Moliere scattering show how the yield enhancement depends on ion energy, backscattering depth, exit angle, scattering potential, atomic numbers of the projectile and target, and target density. It is shown that these quantities depend on a single dimensionless parameter and analytical expressions for them are given which are accurate to better than 1%. DOE

N82-11887# Sandia Labs., Albuquerque, N. Mex.
MODULAR ACCELERATOR INTERCONNECTING AND OPERATING SYSTEMS FOR PBFA-1
Robert A. White 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025397; SAND-81-0755C; CONF-810659-24) Avail: NTIS HC A02/MF A01

Some systems used to operate the first particle beam fusion accelerator are discussed with emphasis on the (PBFA-1) high voltage electrical systems for charging and firing the energy storage section and for simultaneously triggering 36 separate, 2.5 megavolt spark gaps in the pulse forming section are described. DOE

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-11888 California Univ., Los Angeles.
HOLLOW CATHODE, MAGNETIC MULTIPOLE ION SOURCES FOR NEUTRAL BEAM INJECTION Ph.D. Thesis
Dan Michael Goebel 1981 144 p
Avail: Univ. Microfilms Order No. 8120955

A model of the plasma in the ion source is presented by examining the plasma loss mechanisms and calculating the plasma potential as a function of the plasma generator geometry and discharge parameters. The plasma potential is related to the ionization efficiency and stability of the source discharge against mode shifts. The analysis correctly predicts the neutral gas pressure and discharge voltage dependence observed in the plasma generators. A relationship is generated for the evaluation of source parameters such as maximum anode area which are required for discharge stability at given operation point. The model is extended to the quasi-uniform plasmas of the hollow cathode discharge and is utilized in discussing the potential distribution, stablility and performance of that configuration. Dissert. Abstr.

N82-11889*# Boeing Aerospace Co., Seattle, Wash.
ANALYSIS OF SPACE SYSTEMS STUDY FOR THE SPACE DISPOSAL OF NUCLEAR WASTE STUDY REPORT. VOLUME 2: TECHNICAL REPORT Final Report
1981 360 p refs
(Contract NAS8-33847)
(NASA-CR-161888; D180-26426-2-Vol-2; DPD-590; DR-4) Avail: NTIS HC A16/MF A01 CSCL 18G

Reasonable space systems concepts were systematically identified and defined and a total system was evaluated for the space disposal of nuclear wastes. Areas studied include space destinations, space transportation options, launch site options payload protection approaches, and payload rescue techniques. Systems level cost and performance trades defined four alternative space systems which deliver payloads to the selected 0.85 AU heliocentric orbit destination at least as economically as the reference system without requiring removal of the protective radiation shield container. No concepts significantly less costly than the reference concept were identified. A.R.H.

N82-11890# Argonne National Lab., Ill. Chemical Engineering Div.
COMPARISON OF COSTS FOR SOLIDIFICATION OF HIGH-LEVEL RADIOACTIVE WASTE SOLUTIONS: GLASS MONOLITHS VS. METAL MATRICES
L. J. Jardine, R. E. Carlton (TERA Corp.), and M. J. Steindler May 1981 155 p refs
(Contract W-31-109-eng-38)
(ANL-80-121) Avail: NTIS HC A08/MF A01

A comparative economic analysis was made of four solidification processes for liquid high-level radioactive waste. Two processes produced borosilicate glass monoliths and two others produced metal matric composites of lead and borosilicate glass beads and lead and supercalcine pellets. Within the uncertainties of the cost (1979 dollars) estimates, the cost of the four processes was about the same, with the major cost component being the cost of the primary building structure. Equipment costs and operating and maintenance costs formed only a small portion of the building structure costs for all processes. DOE

N82-11891# Los Alamos Scientific Lab., N. Mex.
SPACE NUCLEAR SAFETY AND FUELS PROGRAM Progress Report
S. E. Bronisz, comp. Jun. 1981 17 p refs
(Contract W-7405-eng-36)
(DE81-030501; LA-8904-PR) Avail: NTIS HC A02/MF A01

The development of a radioisotopic power system is discussed. In particular, the impact and thermal response tests of components of a general purpose heat source are addressed. DOE

N82-11892# Oak Ridge National Lab., Tenn.
INTERNATIONAL SAFEGUARDS FOR SPENT FUEL STORAGE Final Report
Myron Kratzer, Edward Wonder, William Immerman, and Frederick Crane Aug. 1981 73 p refs
(Contract W-7405-eng-26)
(DE81-029896; ORNL/SUB-7605-12-2) Avail: NTIS HC A04/MF A01

The nonproliferation effectiveness and political and economic acceptability of prospective improvements in international safeguard techniques for LWR spent fuel storage were analyzed. Although the applicability of item accounting considerably eases the safeguarding of stored spent fuel, the problem of verification is potentially serious. A number of simple gamma and neutron nondestructive assay techniques were found to offer considerable improvements, of a qualitative rather than quantiative nature, in verification-related data and information, and possess the major advantage of intruding very littel on facility operations. A number of improved seals and monitors appear feasible as well, but improvements in the timeliness of detection will not occur unless the frequency of inspection is increased or a remote monitoring capability is established. Limitations on IAEA Safeguards resources and on the integration of results from material accounting and containment and surveillance remain problems. DOE

N82-11893# Sandia Labs., Albuquerque, N. Mex.
UNCERTAINTY ANALYSIS FOR GEOLOGIC DISPOSAL OF RADIOACTIVE WASTE
Robert. N. Cranwell and Jon C. Helton (Arizona State Univ.) 1981 13 p refs Presented at Symp. on Uncertainties Assoc. with the Regulation of the Geol. Disposal of High-Level Radioactive Waste, Gatlinburg, Tenn., 9 Mar. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027206; SAND-81-1718C; CONF-810372-3) Avail: NTIS HC A02/MF A01

The incorporation and representation of uncertainty in the analysis of the consequences and risk associated with the geologic disposal of high-level radioactive waste are discussed. Such uncertainty has three primary components: process modeling uncertainty, model input data uncertainty, and scenario uncertainty. The following topics are considered in connection with the preceding components: propagation of uncertainty in the modeling of a disposal site, sampling of input data for models, and uncertainty associated with model output. DOE

N82-11894# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
MATERIALS CONSIDERATIONS RELATIVE TO MULTIBARRIER WASTE ISOLATION
H. E. McCoy and J. C. Griess Jul. 1981 34 p refs
(DE81-029104; ORNL/TM-7770) Avail: NTIS HC A03/MF A01

The environmental conditions associated with the storage of radioactive wastes are reviewed, and the corrosion of potential waste containment materials under these conditions is evaluated. The desired service life of about 1000 years is beyond the time period for which existing corrosion data can be extrapolated with certainty; however, titanium aloys seem to offer the most promise. The mechanical requirements for canisters and overpacks are considered and several candidate materials are selected. Designs for a canister and an overpack have been developed, and these are used to estimate the costs or the three possible materials of construction. DOE

N82-11895# South Carolina Univ., Columbia. Coll. of Engineering.
USE OF POLYETHERS IN THE TREATMENT OF ACIDIC HIGH-ACTIVITY NUCLEAR WASTES Final Report, 31 May 1975 - 31 Aug. 1980
M. W. Davis, Jr. 21 May 1981 62 p refs
(Contract DE-AS09-76ER-00884)
(DE81-027087; DOE/ER-00884/4) Avail: NTIS HC A04/MF A01

A solvent extraction system was developed which reversibly extracts C from 3M HNO3. The organic phase consists of a matrix solution of 27 vol % TBP, and 68 vol % kerosene. The complexing agents consist of (076M) 5 vol % di-dodecylnaphthalene sulfonic acid (DNS) and 02M Bis (4.4(5')

(1-hydroxyhepty) benzo) 18 crown 6. This is a synergistic system since both complexing agents are necessary to extract the cesium. The data indicate that one crown molecule is involved in the organic complex while the number of DNS molecules is at least one to satisfy the valence requirements but may be more since surfactants of the DNS type tend to form small aggregates in the organic phase. This lack of extraction is probably due to steric effects around the extracted metal atom when two or three ionized DNS molecules are required for valence adjustment. Radiation stability of the process is also discussed. DOE

N82-11896# Hanford Engineering Development Lab., Richland, Wash.

ZIRCALOY CLADDING: TOUGH CONTAINMENT FOR SPENT FUEL STORAGE

R. E. Einziger, D. M. Bosi, and A. K. Miller (Stanford Univ.) 1981 7 p ref Presented at the AM. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7-12 Jun. 1981

(Contract DE-AC14-76FF-02170)

(DE81-024105; HEDL-SA-2325-FP; CONF-810606-57) Avail: NTIS HC A02/MF A01

The potential Zircaloy cladding degradation mechanisms are examined. It is concluded that in a limited air atmosphere, only stress rupture, stress corrosion cracking (SSC), and fatigue fracture could possibly compromise the cladding with stress-rupture of the pressurized fuel rods appearing to be the most likely mode of breach. Due to uncertainties in Blackburn's calculations, an experimental and theoretical study of stress rupture, stress corrosion cracking and the fatigue-fracture behavior of the cladding under postulated dynamic loads was conducted. Results presented may equally apply to dry storage. J.M.

N82-11897# Brookhaven National Lab., Upton, N. Y.

BROOKHAVEN NATIONAL LABORATORY TANDEM ACCELERATOR UPGRADING PROGRAM

P. Thieberger, M. A. Manni, R. Lindgren, M. McKeown, C. Carlson, and H. E. Wegner 1981 4 p refs Presented at the 3rd Intern. Conf. on Electrostatic Accelerator Technol., Oak Ridge, Tenn., 13 Apr. 1981

(Contract DE-AC02-76CH-00016)

(DE81-025093; BNL-29612; CONF-810468-9) Avail: NTIS HC A02/MF A01

The original 10 MV waranteed MP Van de Graff accelerator of 1970 now operates in excess of 14 MV because of many improvements over the years. The most recent improvements completed and those that are presently under construction and being implemented described include tube extension, insulated power shift drive, sorting cable and rod system for individual tube section voltage conditioning, and improved terminal design. DOE

N82-11898# California Univ., Livermore. Lawrence Livermore Lab.

NOVA PULSE POWER SYSTEM DESCRIPTION AND STATUS

R. W. Holloway, K. Whitman, B. T. Merritt, D. G. Gritton, and J. A. Oicles 1 Jun. 1981 5 p refs Presented at 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1-3 Jun. 1981 Submitted for publication

(Contract W-7405-eng-48)

(DE81-025600; UCRL-85720) Avail: NTIS HC A02/MF A01

The Nova laser system, designed to produce critical data in the nation's inertial confinement fusion effort, is the world's largest peak power laser and presents various unique pulse power problems. Pulse power systems for this laser are described, the evolutionary points from prior systems are pointed out, and the current status of the hardware is given. DOE

N82-11899# California Univ., Livermore. Lawrence Livermore Lab.

MICROSTRUCTURES FOR HIGH-ENERGY X-RAY AND PARTICLE-IMAGING APPLICATIONS

N. M. Ceglio, G. F. Stone, and A. M. Hawryluk May 1981 18 p refs Presented at the 16th Symp. on Electron Ion and Photo Beam Technol., Dallas, 26 May 1981

(Contract W-7405-eng-48)

(DE81-026531; UCRL-85506; CONF-8105103-1) Avail: NTIS HC A02/MF A01

Coded imaging techniques using thick, micro-Fresnel zone plates as coded apertures were used to image X-ray emissions (2-20 keV) and 3.5 MeV Alpha particle emissions from laser driven micro-implosions. Image resolution in these experiments was 3-8 micrometers. Extension of this coded imaging capability to higher energy X-rays (approximately 100 keV) and more penetrating charged particles (e.g. approximately 15 MeV protons) requires the fabrication of very thick (50-200 mirometers), high aspect ratio (10:1), gold Fresnel zone plates with narrow linewidths (5-25 micrometers) for use as coded aperatures. A reactive ion etch technique in oxygen was used to produce thick zone plate patterns in polymer films. The polymer patterns serve as electroplating molds for the subsequent fabrication of the free-standing gold zone plate structures. DOE

N82-11900# California Univ., Livermore. Lawrence Livermore Lab.

ANALYSIS OF STANDARD REFERENCE MATERIALS BY ABSOLUTE INAA

Robert E. Heft and Rebecca F. Koszykowski Jul. 1981 18 p refs Presented at 6th Intern. Conf.: Mod. Trends in Activation Analysis, Toronto, 15-19 Jun. 1981 Submitted for publication

(DE81-025925; UCRL-85365; CONF-810682-7) Avail: NTIS HC A02/MF A01

Three standard reference materials: flyash, soil, and ASI 4340 steel, are analyzed by a method of absolute instrumental neutron activation analysis. Two different light water pool-type reactors were used to produce equivalent analytical results even though the epithermal to thermal flux ratio in one reactor was higher than that in the other by a factor of two. DOE

N82-11901# Argonne National Lab., Ill.

STORAGE RING INJECTION

R. Burke 1980 11 p refs Presented at the Heavy Ion Fusion Workshop, Berkeley, Calif., 29 Oct. - 9 Nov. 1980

(Contract W-31-109-eng-38)

(DE81-023846; CONF-8010203-2) Avail: NTIS HC A02/MF A01

Basic issues involved in injecting the beam into storage rings were considered. The main conclusion is that straightforward adjustments of the storage ring parameters makes injection easy. The adjustments also result in lower bending magnet fields, and high field superconducting magnets (e.g., 5 Tesla) are not necessary. The design changes do not necessarily affect the Keil-Schnell criterion for stability of the longitudinal microwave instability. Because the beams are expected to be unstable, but with slow growth rates, the vacuum chamber impedances required to give equal risetimes for the various designs are compared for systems posing various degrees of difficulty for injection. DOE

N82-11902# Argonne National Lab., Ill.

HEAVY ION FUSION PROGRAM AT ARGONNE

R. L. Martin, R. Arnold, R. Burke, and J. Watson 1980 10 p refs Presented at the 7th All-Union Natl. Conf. on Particle Acceleration, Dubna, USSR, 14-16 Oct. 1980

(Contract W-31-109-eng-38)

(DE81-023905; CONF-8010206-1) Avail: NTIS HC A02/MF A01

The heavy ion preaccelerator and low beta linac are developed. The preaccelerator and the initial linac cavities are operational. The preaccelerator has achieved pulsed 50 mA Xe(+1) beams at 1.3 MeV. A 100 mA low emittance xenon (or mercury) source, a Penning discharge Pierce extraction source with a single 3 cm diameter aperture, was developed. Xenon currents of 100 mA were extracted with no indication of plasma sheath instability. The high voltage power supply is a dynamitron which was extensively modified for maximum pulsed current operation of 1.3 MV. The oscillator supports more than 40 mA of beam associated current with less than 0.25% voltage droop in 100 microns. DOE

N82-11903# Brookhaven National Lab., Upton, N. Y.

HEAVY ION BEAM INTERACTION AND ENERGY PARTITION IN THE INITIAL STAGES OF ICF TARGET IRRADIATION

Paul Suh, Henry Makowitz, Mike Stauber, George H. Miley, and D. Harris Nov. 1980 30 p refs Presented at the Intern. Conf. on Plasma Sci., Santa Fe, N. Mex., 18 May 1981 Prepared

in cooperation with Grumman Aerospace Corp., Bethpage, N.Y. and Illinois Univ., Urbana
(Contract DE-AC02-76CH-00016)
(DE81-025296; BNL-29512; CONF-810527-6) Avail: NTIS HC A03/MF A01

An order of magnitude analysis of the effect of 20 GeV U-ion beam impact on an idealized inertial confinement fusion target, Be or Au ablator region was made, and the beam interaction and energy partition were studied for the initial stages of target irradiation. Uniform heating and an expansion perserving uniform density of the ablator medium was assumed for the initial stage of beam interaction. Significant differences in the partition of energy occur between Be and Au ablators. For Au, the main channels for the heavy-ion beam energy output are the escaping radiation energy (10 to 20% of the energy input, based on an extrapolation) and the thermal energy. For Be the ablator thermal energy and ionization channels dominate. DOE

N82-11904# General Atomic Co., San Diego, Calif.
KUGEL: A THERMAL, HYDRAULIC, FUEL PERFORMANCE AND GASEOUS FISSION PRODUCT RELEASE CODE FOR PEBBLE BED REACTOR CORE ANALYSIS
B. I. Shamasundar and M. E. Fehrenbach May 1981 273 p refs
(Contract DE-AT03-76ET-35300; GA Proj. 6400)
(DE81-026561; GA-A-16222) Avail: NTIS HC A12/MF A01

A computer code developed to analyze the thermal, hydraulic and fuel particle performance characteristics of axisymmetric pebble bed reactors is presented. This FORTRAN 5 program is overlayed into three main segments to minimize core storage. Variable dimensioning was introduced so that storage allocation is based on the user-specified problem size, thus allowing the code to handle any problem with uniform mesh interval. This provides the flexibility to choose thermal problem mesh sizes different from those used in the physics analyses. The code can also handle a non-uniform void fraction distribution. DOE

N82-11905# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
TRAJECTORY ANALYSIS OF THE ELECTRONS IN A MAGNETRON-TYPE GUN Progress Report
A. Ezzeddine and L. D. Smullin Sep. 1980 26 p refs
(Contract DE-AS02-78ET-51002)
(DE81-027860; DOE/ET-51002/1; PRR-80/21; PFC/RR-80-17) Avail: NTIS HC A03/MF A01

The Herrmannsfeldt electron trajectory code was modified to analyze the trajectories in magnetron injection guns with perveances I/V (3/2) in the range of 0.00001 Perv. When tested on a particular magnetron gun, the computed perveance agreed well with experimental data for values V/B (2) less that or equal to 0.006, the flo was nearly laminar with V sub perpendicular /V sub parallel values reaching 12 percent. For larger voltages, both experiment and calculations indicate a turbulent electron flow. DOE

N82-11906# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
THEORY OF ELECTRON CYCLOTRON HEATING IN THE CONSTANCE 2 EXPERIMENT
M. E. Mauel Mar. 1981 30 p refs
(Contract DE-AC02-78EG-51013)
(DE81-028269; DOE/ET-51013/4; PFC/RR-81-2R) Avail: NTIS HC A03/MF A01

The bounce-averaged quasi-linear equation for a non-relativistic mirror-confined plasma interacting with electromagnetic waves is derived for use in the study of ECRH of the Constance II mirror experiment. The derivations follows the more formal examples given by Berk for electrostatic waves and Bernstein and Baxter for relativistic plasmas. The validity of the theory is discussed by examining individual particle orbits in an EM field. The local dispersion relation is found while deriving a self-consistent WKB theory which can be used to estimate the power transferred from the launching horn to the plasma. DOE

N82-11907# Oak Ridge National Lab., Tenn.
ENGINEERING CHALLENGES OF FUSION-REACTOR DEVELOPMENT
Jan B. Talbot 1981 10 p refs Presented at the Soc. of Women Eng. 1981 Natl. Conv., Anaheim, Calif., 24-28 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024129; CONF-810699-1) Avail: NTIS HC A02/MF A01

A brief review of the fusion research program and some problems to be faced in the near future and described. DOE

N82-11908# Sandia Labs., Albuquerque, N. Mex.
CONSIDERATIONS FOR THE DESIGN, IMPLEMENTATION, AND EFFECTIVE OPERATION OF SANDIA'S SUPER-POWER GENERATORS
Steven A. Goldstein, G. W. Barr, J. P. VanDevender, and T. H. Martin 1981 4 p refs Presented at the 3rd IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 1 Jun. 1981
(Contract DE-AC04-76DP-00789)
(DE81-025404; SAND-81-1553C; CONF-810659-25) Avail: NTIS HC A02/MF A01

After firing its first full power, 36-module shot on schedule and on budget, the particle beam fusion accelerator-1 (PBFA) progressed from an output parameter characterization phase through a stable operating point optimization phase and into an operational phase for conducting advanced power flow studies and ion beam driven inertial confinement fusion experiments. The development of the PBFA Facility is described from the viewpoints of facility and accelerator design criteria, implementation of these designs, and effective operation. DOE

N82-11909# Department of Energy, Washington, D. C. Office of Nuclear Waste Management.
EVALUATION AND REVIEW OF ALTERNATIVE WASTE FORMS FOR IMMOBILIZATION OF HIGH-LEVEL RADIOACTIVE WASTES
1 Jul. 1981 42 p
(DE81-026323; DOE/TIC-11472; Rept-3) Avail: NTIS HC A03/MF A01

The relative strengths and weaknesses of the alternative forms are considered. Topics covered include uncoated waste forms, and the need for adopting additional standardized tests, standard reference materials, common units and standardized methods of data presentation. It was found that comparative data on leach rates in waters equilibrated with candidate rocks and potential geologic environments are almost nonexistent and are essential to establish relevant long term extrapolation of waste form performance. Understanding radiation damage effects on the microstructure and leaching mechanisms of polycrystalline ceramics is still insufficient to judge long term reliability of this class of waste forms. More extensive data on rates and mechanisms of leaching of all waste forms under radiation and repository conditions are needed. Additional studies of fundamental mechanisms controlling long term reliability of glass and alternative waste forms are strongly encouraged. DOE

74 OPTICS

Includes light phenomena.

N82-11910# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Environmental Lab.
INCLUSION OF A SIMPLE VEGETATION LAYER IN TERRAIN TEMPERATURE MODELS FOR THERMAL INFRARED (IR) SIGNATURE PREDICTION Final Report, 1 Oct. 1979 - 1 Oct. 1980
Lee K. Balick, Randy K. Scoggins, and Lewis E. Link, Jr. Aug. 1981 44 p refs
(DA Proj. 4A7-62730-AT-42; DA Proj. 4A7-62719-AT-40)
(AD-A104469; WES/MP/EL-81-4) Avail: NTIS HC A03/MF A01 CSCL 17/5

Thermal infrared signatures of natural and cultural features are dynamic, varying with time and weather conditions. Prediction of thermal signatures for specific conditions requires first that the actual temperature of the features be determined; for vegetation canopies this involves the average temperatures of canopy components and for planar (nonvegetated) surfaces the temperature of the surface. Models have been developed to handle layered vegetation canopies and layered ground surfaces; however,

efforts have only begun to formulate a comparable capability for intermediate conditions such as grass covered surfaces where both the terrain surface and vegetation influence the average surface temperature. This report presents a procedure, named VEGIE, that predicts the temperature of terrain surfaces which contain a simple layer of vegetation. VEGIE is designed as an interim procedure for immediate application in lieu of more sophisticated and theoretical treatments of this problem. Operational flexibility and simplicity are preserved by using VEGIE as a submodel to the Terrain Surface Temperature Model (TSTM) developed previously at the U.S. Army Engineer Waterways Experiment Station. The TSTM predicts the surface temperature of nonvegetated layer and planar features using material thermophysical properties and meteorological conditions. These models are applied to a deciduous and a coniferous canopy where the CSU model is valid but VEGIE is not. VEGIE is applied to the problem of estimating thermal signatures for terrain surfaces with less than total foliage cover, the consequences of changes in foliage cover, differing emissivities for the soil and vegetation, and reflected sky radiation. GRA

N82-11911# GTE Systems Group, Needham, Mass. Communication Systems Div.

LOCAL DISTRIBUTION FIBER OPTIC CABLE COMMUNICATION SYSTEM Final Report, Feb. 1979 - Sep. 1980

A. Morelli, James Splaine, and F. J. Savell Fort Monmouth, N.J. Army Communications Research and Development Command 20 Mar. 1981 165 p

(Contract DAAK80-79-C-0508; DA Proj. 1E4-63707-D-246) (AD-A104491; CORADCOM-79-0508-F) Avail: NTIS HC A08/MF A01 CSCL 17/2

This report contains the final description of the electrical, electrooptical and mechanical design of the fiber optic communication link interconnecting the MS and CI shelters of the message switch (AN/TYC-39). A summary of test results and tests performed at the contractor's facility is provided. Author (GRA)

N82-11912# Washington State Univ., Pullman. Dept. of Physics.

LIGHT SCATTERING BY BUBBLES IN LIQUIDS OR IN GLASS Interim Technical Report, 1 Jul. 1980 - 31 Aug. 1981

Philip L. Marston, Dean S. Langley, and Dwight L. Kingsbury 1 Sep. 1981 92 p refs

(Contract N00014-80-C-0838)

(AD-A104241; ITR-1) Avail: NTIS HC A05/MF A01 CSCL 20/6

This technical report consists of publications, manuscripts, and supplemental information related to the scattering of light by bubbles in liquids and in glass. The emphasis of the report is on the scattering by air bubbles in water into the angular regions where diffraction makes essential corrections to elementary ray optics. For bubbles these regions are backward, forward and critical angle scattering. Most of the previous literature on light scattering is concerned with drop-like objects where the refractive index of the scatterer exceeds that of the surroundings. The present results should be useful for the optical characterization of microbubbles at sea and in water tunnels, or for the prediction of the optical properties of bubbly media. They should also be useful for laser-Doppler anemometry with microbubbles and the detection of microbubbles in glass. Certain phenomena described here should be present for other spherical or nearly spherical scatterers where the refractive index is less than that of the surroundings, for example: air bubbles in ice, water inclusions in fused quartz (such as those present in varieties of opal glass), ice spheres in water, and superheated drops in a host liquid. The coarse structure in the critical scattering region can be present even if the scatterer is not spherical. GRA

N82-11913# Corning Glass Works, N.Y.

SINGLE MODE OPTICAL WAVEGUIDE DESIGN INVESTIGATION Progress Report

V. A. Bhagavatula, R. A. Westwig, and D. B. Keck 10 Jul. 1981 13 p

(Contract N00173-80-C-0563)

(AD-A104584; PR-3) Avail: NTIS HC A02/MF A01 CSCL 20/6

A total of six fibers have been fabricated with parameters fitting the design matrix; Microbend sensitivity measurements have been made on five of the fibers; The data collection procedure for the angular offset sensitivity measurements has been modified and automated in order to improve measurement reliability; and Lateral offset measurements have been made on two fibers as a function of V-value and the data fitted to the equation given in Progress Report 2. Author (GRA)

N82-11914# Harry Diamond Labs., Adelphi, Md.

THE DECONVOLUTION OF AEROSOL BACKSCATTERED OPTICAL PULSES TO OBTAIN SYSTEM-INDEPENDENT AEROSOL SIGNATURES

Dennis McGuire and Michael Conner Jun. 1981 66 p refs (AD-A104578; HDL-TR-1944) Avail: NTIS HC A04/MF A01 CSCL 20/6

Means are discussed for extracting system-independent aerosol signatures from aerosol backscatter measurements obtained with a specific pencil beam active optical detection system. Such signatures are required before the backscatter data can be applied to various proposed optical fuze designs for determining their aerosol vulnerability and to the investigation of aerosol discrimination schemes. The measurement system, which has been used in numerous experiments to probe such aerosols as weather clouds and military smokes, is a short pulse GaAs laser probe (pulse width + or - 10 nanoseconds whose range sensitivity extends from near the system to beyond 10 meters. A computationally fast numerical deconvolution algorithm is devised together with a comprehensive supporting analysis. Both indicate that severe signal-to-noise ratio constraints apply to the achievement of meaningful superresolution. While the signal-to-noise ratios typical of recent measurements are likely to satisfy the severe constraints discovered, many of the earlier data are too noisy and thus require other signature determination methods. GRA

N82-11915# Owens-Illinois, Inc., Toledo, Ohio. Corporate Technology Div.

ANTIREFLECTING FILM DEVELOPMENT Final Report

Thomas S. Hahs 11 May 1981 13 p ref

(Contract W-7405-eng-48)

(DE81-030010; UCRL-15373) Avail: NTIS HC A02/MF A01

A metal-organic precursor was formulated that is converted by heating on surfaces of ordinary glass to a phase-separated metal-organic-derived glass coating, without exceeding 3750 C. This phase-separated layer is quickly and easily leached by nitric acid to leave a graded index, antireflective coating on ordinary glass that protects it against damage by high fluence of laser light at 1060 nm and shorter wavelengths. The metal-organic precursor is relatively inexpensive, and the thickness applied to the glass surface is not very critical for the achievement of protection for the glass surface from 1 ns pulses of laser energy. Laser damage testing at 248 nm with this coating on silica discs was thought to show separation of the coating from the substrate at fluences as low as 1.2 J/sq cm with fracture damage at 4.9 J/sq cm. DOE

N82-11916# California Univ., Livermore. Lawrence Livermore Lab.

REFLECTION/TRANSMISSION PHASE SHIFT INTERFEROMETER AND VIEWING OPTICS

J. A. Monjes, B. W. Weinstein, and D. L. Willenborg 15 Jun. 1981 25 p refs Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10-12 Jun. 1981

(Contract W-7405-eng-48)

(DE81-027658; UCRL-85281; CONF-810613-9) Avail: NTIS HC A02/MF A01

The interferometer and viewing optics that are the main optical components of an automated surface mapping system (ASM) used to characterize the surface topography and the wall thickness uniformity of opaque and transparent spherical shells is described. To characterize surface finish or wall thickness of spherical shells with an accuracy of 10 nm and a resolution of 1 micron the differential phase shift between two beams of orthogonal polarizations is measured, before and after the probe beam has interacted with the test object. DOE

N82-11917# California Univ., Livermore. Lawrence Livermore Lab.

POLISHING-TO-FIGURING TRANSITION IN TURNED OPTICS

Norman J. Brown, Phillip C. Baker, and Robert E. Parks (Arizona Univ., Tucson) 29 Jul. 1981 8 p refs Presented at 25th Ann. Intern. Tech. Symp., San Diego, Calif., 24-28 Aug. 1981 (DE81-028691; UCRL-86513) Avail: NTIS HC A02/MF A01

The spatial frequency response of elastic backed flexible lapping belts is examined. The transition from planning off to propagating sinusoidal ripple is shown to be extremely sensitive to ripple frequency. DOE

N82-11918# Illinois Univ., Urbana. School of Chemical Sciences.

HIGH-PRESSURE OPTICAL STUDIES

H. G. Drickamer 1981 11 p refs Presented at the Conf. on High Pressure Phys., Bad Honnef, West Germany, Aug. 1981 (Contract DE-AC02-76ER-01198)

(DE81-025577; DOE/ER-01198/1359; CONF-810828-1) Avail: NTIS HC A02/MF A01

In rare earth chelates, the efficiency of 4f-4f emission of the rare earth is controlled by the feeding from the singlet and triplet levels of the organic ligand. These ligand levels can be strongly shifted by pressure. Photochromic crystals change color upon irradiation due to occupation of a metastable ground state. In thermochromic crystals, raising the temperature accomplishes the same results. For a group of molecular crystals (anils) at high pressure, the metastable state can be occupied at room temperature. The relative displacement of the energy levels at high pressure also inhibits the optical process. Effects on luminescence intensity are shown to be consistent. In the area of microscopic - molecular relationships, the effect of viscosity and dielectric properties on rates of nonradiative (thermal) and radiative emission, and on peak energy for luminescence is demonstrated. DOE

N82-11919# Los Alamos Scientific Lab., N. Mex.

IMPROVEMENTS TO A HIGH-FREQUENCY FIBER-OPTIC SYSTEM FOR PLASMA DIAGNOSTICS

J. W. Ogle, P. B. Lyons, L. Looney, L. Hocker, M. A. Nelson, P. A. Zagarino, T. J. Davies, R. D. Simmons, R. Selk, and B. Hopkins 1981 7 p refs Presented at the SPIE Intern. Symp., San Diego, Calif., 24-28 Aug. 1981 Prepared in cooperation with Edgerton, Germeshausen and Grier, Inc, Santa Barbara, Calif., and Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev. (Contract W-7405-eng-36)

(DE81-028741; LA-UR-81-2136; CONF-810810-18) Avail: NTIS HC A02/MF A01

Improvements in the system response, dynamic range, and calibration of the diagnostic system are described. Plastic-clad silica fiber is used as a radiation-to-light converter using the Cerenkov process. A spectral equalizer device is used to compensate for the material dispersion in the fiber, increasing the frequency response and the dynamic range. The calibration system uses a pulsed injection laser diode injected into the fiber at the radiation end of the fiber and detected by a microchannel plate photomultiplier tube on the recording end. The injection laser diode is triggered by a synchronous trigger delay unit, which also triggers a sampling or real time scope after as much as 10 microseconds delay with < 50 ps jitter. The system improvements are described in detail and the utility of these components in other plasma diagnostic systems is discussed. DOE

N82-11920# National Bureau of Standards, Boulder, Colo.

REFRACTED-RAY SCANNING (REFRACTED NEAR-FIELD SCANNING) FOR MEASURING INDEX PROFILES OF OPTICAL FIBERS

M. Young May 1981 61 p refs

(PB81-224610; NBS-TN-1038) Avail: NTIS HC A04/MF A01 CSCL 20F

An elementary description and tutorial overview of the refracted-ray method of measuring fiber-index profiles is given. Results concerning the theoretical foundation, the linearity and precision, resolution limit and edge response, and other aspects of the method are presented. In particular it was found that index differences may be measured to five percent or better and spatial resolution is diffraction limited. The author concludes by showing about 3 percent agreement with another laboratory, and good agreement with numerical aperture measurements performed by participants in a round-robin experiment. GRA

N82-11288*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE DEEP SPACE OPTICAL CHANNEL 2: WAVE PROPAGATION EFFECTS

J. Katz *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 53-58 refs (For primary document see N82-11279 02-31)

Avail: NTIS HC A11/MF A01 CSCL 20N

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-11921 State Univ. of New York at Buffalo.

TEMPERATURE MEASUREMENT IN TURBULENT ARCS Ph.D. Thesis

Yun-ko Nickey Chien 1981 170 p

Avail: Univ. Microfilms Order No. 8122163

A technique using spectroscopic measurement to determine the temperature distribution in a turbulent arc was developed. The time-averaged radial distributions of temperature and the mean square fluctuations of temperature were obtained for a cascade D.C. argon arc in a 1 cm diameter channel having laminar flow (in approx. 0.1 g/s) at 100 A And 65 A, and for turbulent flow (in approx. 7.7 g/s) at 65 A. With laminar arcs fluctuations proceeded inward from the outer edge; in the present case temperature fluctuations were about 1 percent and 4 percent at the centerline and outer edge, respectively. Relatively large fluctuations in temperature, about 5 percent, were found across the entire column where the arc was turbulent. Centerline temperature were 11500 K and 10500 K for the laminar 100 A and 65 A arcs and 10650 K for the turbulent 65 A arc. The results obtained for the laminar arcs were in good agreement with published values; those for the turbulent arc were also in general agreement with more qualitative experiment results, and with theory. Dissert. Abstr.

N82-11922 Cornell Univ., Ithaca, N. Y.

THE EFFECTS OF TOROIDAL GEOMETRY AND SCATTERING BY DENSITY FLUCTUATIONS ON THE ACCESSIBILITY AND ENERGY DEPOSITION OF LOWER HYBRID WAVES Ph.D. Thesis

Paul Thaddeus Bonoli 1981 136 p

Avail: Univ. Microfilms Order No. 8119492

The effects of toroidicity and density fluctuations on the propagation of lower hybrid waves were studied. These effects result mainly from changes in k double bar as the wave propagates (k double bar is the wave number parallel to the applied magnetic field). With respect to toroidal effects, k double bar changes due to the nonconstancy of the poloidal mode number in toroidal geometry. Using ray tracing techniques, an assessment of this toroidal effect was made. It is found that waves, which on the basis of the cylindrical geometry theory would be inaccessible, may actually propagate to the plasma center and damp. The result is related to the onset of ray ergodicity. Further, it is shown that for accessible waves the optimal poloidal launch point is near the top or bottom of the torus. In order to include the effects of density fluctuations, an electromagnetic wave kinetic equation is derived, and solved by a Monte Carlo technique. It is found that scattering can further enhance accessibility. Dissert. Abstr.

N82-11923 California Univ., Los Angeles.

FINITE TEMPERATURE RELATIVISTIC MAGNETOHYDRODYNAMIC WINDS Ph.D. Thesis

Fumichika Stanley Fujimura 1981 158 p

Avail: Univ. Microfilms Order No. 8120949

The cold relativistic magnetohydrodynamic (MHD) wind analysis of Michel is generalized to finite temperatures. In the monopole geometry, the MHD differential equations integrate to algebraic equations even for finite temperatures. Critical solutions

are sought, i.e., wind solutions that start from a specified initial point, go through the intermediate (Affven) critical point, and through a fast MHD critical point. The analytical analysis is unable to find explicit solutions for the finite temperature relativistic MHD winds. However, the analysis is able to indicate certain conditions that must be satisfied for the critical solutions to exist as well as some approximate solutions to the wind. The problem is solved numerically and the results verify the analytical analysis. Furthermore, the numerical calculations reveal a uniform parametric characterization of the asymptotic wind solution in terms of the initial parameters. The finite temperature asymptotic wind solutions differ considerably from the cold wind minimum torque solutions of Michel. Dissert. Abstr.

N82-11924# Nagoya Univ. (Japan). Inst. of Plasma Physics.
THEORY OF DRIFT INSTABILITIES AND THE ASSOCIATED ANOMALOUS TRANSPORT
K. Nishikawa (Hiroshima Univ.), M. Wakatani (Kyoto Univ., Gokasho, Japan), T. Tuda (Japan Atomic Energy Research Inst., Tokai), T. Tange (Hiroshima Univ.), and T. Hatori Jul. 1981 134 p refs
(IPPJ-Rev-1) Avail: NTIS HC A07/MF A01

Drift waves, which are inherent in inhomogeneous magnetized plasmas, are considered the most promising candidate for explaining anomalous particle and electron heat transport in toroidal plasmas. The linear and nonlinear theories of drift instability are examined. Anomalous transport in Tokamaks is examined from a phenomenological viewpoint as well as in to relation to kinetic theory. Saturation levels and modes are discussed as well as the effect of magnetic shear and of the torus. A.R.H.

N82-11925# Nagoya Univ. (Japan). Inst. of Plasma Physics.
LEAST SQUARES AUTOREGRESSIVE (MAXIMUM ENTROPY) SPECTRAL ESTIMATION FOR FOURIER SPECTROSCOPY AND ITS APPLICATION TO THE ELECTRON CYCLOTRON EMISSION FROM PLASMA
N. Iwama, A. Inoue, T. Tsukishima, M. Sato, K. Kawahata, and K. Sakai (Osaka Univ.) Jul. 1981 47 p refs Presented at the 5th Intern. Conf. on Infrared and Millimeter Waves, Wuerzburg, West Germany, 6-10 Oct. 1980
(IPPJ-530) Avail: NTIS HC A03/MF A01

A procedure for the maximum entropy spectral estimation is studied for the purpose of data processing in Fourier transform spectroscopy. The autoregressive model fitting is examined under a least squares criterion based on the Yule-Walker equations. An AIC-like criterion is suggested for selecting the model order. The principal advantage of the new procedure lies in the enhanced frequency resolution particularly for small values of the maximum optical path-difference of the interferogram. The usefulness of the procesure is ascertained by some numerical simulations and further by experiments with respect to a highly coherent submillimeter wave and the electron cyclotron emission from a stellarator plasma. Author

N82-11926# Nagoya Univ. (Japan). Inst. of Plasma Physics.
AN ENERGY INTEGRAL AND VARIATIONAL PRINCIPLE FOR PLASMA KINETIC MODES
Sanae-Inoue Itoh (Hiroshima Univ.), Kimitaka Itoh (Japan Atomi Energy Research Inst., Tokai), and Yoshinosuke Terashima Aug. 1981 15 p refs
(IPPJ-531) Avail: NTIS HC A02/MF A01

An energy principle is extended to include kinetic processes, finite gyroradius effects and wave-particle interactions, in electromagnetic instabilities in a toroidal plasma. The present arguments are based on the energy integrals which are derived from the eigenmode equations for electromagnetic perturbations. Inclusion of the finite gyroradius effects in the energy integral shows that this integral can be used for eigenmode by minimizing the excess energy of the perturbed state. The extended stability conditions for kink-like mode and ballooning mode are obtained by use of this improved energy principle. For the case where wave-particle interaction is important, the energy integral becomes a rate equation of energy exchange, and a variational form can independently be constructed for the mode analysis. A.R.H.

N82-11927# Nagoya Univ. (Japan). Inst. of Plasma Physics.
CHARGE TRANSFER IN COLLISIONS OF Li-3(+) AND Be-4(+) IONS WITH ATOMIC HYDROGEN AT LOW IMPACT ENERGY
T. Ohyama and Y. Itikawa Aug. 1981 22 p refs
(IPPJ-532) Avail: NTIS HC A02/MF A01

Total charge transfer cross sections are calculated for the collisons of Li-3(+) and Be-4(+)ions with H (ls) atoms in th low energy region (E< 25 keV/amu). The perturbed-stationary-state method in the impact parameter approximation is used with a basis set of adiabatic one-electron two-center molecular orbitals. For the Li-3(+)-H system, a reasonable is found between the present calculation and the recent experiment. Author

N82-11928# Nagoya Univ. (Japan). Inst. of Plasma Physics.
OBLIQUE PROPAGATION OF ELECTRON THERMAL MODES BELOW THE ELECTRON PLASMA FREQUENCY WITHOUT BOUNDARY EFFECTS
T. Ohnuma (Tohoku Univ.), T. Watanabe (Hiroshima Univ.), and H. Sanuki Aug. 1981 17 p refs
(IPPJ-533) Avail: NTIS HC A02/MF A01

The propagation characteristics and refractive effects of an oblique electron thermal mode without boundary effects below the electron plasma frequency were studied experimentally and theoretically in an inhomogeneous magnetized plasma. The behavior of this mode observed experimentally was confirmed by the theoretical analysis based on a type of ray theory. Author

N82-11929# Nagoya Univ. (Japan). Inst. of Plasma Physics.
BOOSTING UP OF NEUTRAL BEAM HEATING POWER BY SLOWLY RISING TOROIDAL FIELD
R. Y. Lin (Academia Sinica, Peking), K. Hirano, M. Okamoto, K. Shimizu, and T. Amano Aug. 1981 33 p refs
(IPPJ-534) Avail: NTIS HC A03/MF A01

A system of 1-D transport codes combined with Fokker-Planck codes was used to simulate plasmas undergoing compression with beam injection for the 'R-Project Tokamak'. The impurity radiation is not included. The numerical model contains the neoclassical transport including the Ware pinch, empirical anomalous particle and electron heat transports based on the Alcator scaling, and neutral particle transport. The combination results are very encouraging. They show that by sinusoidally increasing the toroidal magnetic field and the plasma current simultaneously, it is possible to significantly increase the temperature with a very slow compression. The final ion temperature is very weakly dependent on the compression time from 0.5 sec to 1 sec for the 'R-Project Tokamak'. If the 'R-Project Tokamak' plasma is compressed by sinusoidally increasing the magnetic field and plasma current simultaneously, then the beam power which is necessary to obtain an average ion temperature of keV without compression 15 MW can be decreased to 8.5 MW. Author

N82-11930# ARO, Inc., Arnold Air Force Station, Tenn.
ANALYTICAL STUDIES OF HIGH-PRESSURE MHD ACCELERATORS Final Report, 1 Oct. 1977 - 30 Sep. 1978
G. L. Whitehead AEDC Sep. 1981 81 p refs
(AD-A104686; AEDC-TR-81-18) Avail: NTIS HC A05/MF A01 CSCL 20/7

An analytical study was made of the feasibility of using an MHD-augmented arc as the primary component of a large reentry vehicle test facility. Computer studies of the performance of MHD accelerator channels were made for systems having channel input power of 50 MW to 1,700 MW. It was determined that complete simulation of reentry conditions is not possible in a single extended-flow facility. The studies showed, however, that very large increases in performance over existing arc facilities could be attained by use of MHD augmentation, provided, however, that several very difficult design problems could be solved. The most critical problem area was identified as that of maintaining the design integrity of the magnetic-field walls of the channel, which requires that a high level of electrical insulation be retained under a heating load of up to 10 sq cm. Only a marked increase in high-temperature materials technology would permit the use of uncooled refractories for these walls. The possibility of using film cooling for these walls was explored and it was found that, in addition to a substantial increase in complexity, such an

approach would result in significant reductions in performance and efficiency of the MHD channel. Author (GRA)

N82-11931# Harry Diamond Labs., Adelphi, Md.
SYMMETRIES OF THE NONLINEAR CONDUCTIVITY FOR A RELATIVISTIC TURBULENT PLASMA
Howard E. Brandt Mar. 1981 58 p refs
(DA Proj. 1L1-61101-A9-1A)
(AD-A104544; HDL-TR-1927) Avail: NTIS HC A04/MF A01 CSCL 20/9

The nonlinear conductivity tensor for a relativistic plasma has an important symmetry property which can be related to the nondissipative nature of the nonlinear current. This property is useful in establishing relationships in the theory of plasma turbulence. Following a review of the nonlinear conductivity, its definition is used explicitly to obtain the symmetry property. The latter is then related to the nondissipative property, and is shown to be reducible to the well-known nonrelativistic longitudinal case. Author (GRA)

N82-11932# Texas Univ. at Austin. Fusion Research Center.
ION THERMAL CONDUCTIVITY FOR A PURE TOKAMAK PLASMA Ph.D. Thesis
Curtis William Bolton, III Jun. 1981 117 p refs
(Contract DE-AC05-76ET-53036)
(DE81-029710; DOE/ET-53036/28) Avail: NTIS HC A06/MF A01

The ion thermal conductivity is calculated for a wide range of aspect ratios and collision frequencies. The calculation is done by solving the drift kinetic equation, with a model collision operator, using a finite element method, and then calculating the energy weighted friction force to determine the heat flux. The thermal conductivity, determined from the heat flux, is then curve fitted to analytic formulas. These formulas allow the conductivity to be calculated at all collision frequencies and aspect ratios down to about 3. DOE

N82-11933# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
ANTENNA-PLASMA COUPLING THEORY FOR ICRF HEATING OF LARGE TOKAMAKS
A. Bers, L. P. Harten, and A. Ram Feb. 1981 7 p refs
(Contract DE-AC02-78FT-51013)
(DE81-029815; DOE/ET-51013/9) Avail: NTIS HC A02/MF A01

The radiation impedance of, and field excitation by, current sheets external to a large (minor radius) plasma are calculated. The finite-size antenna current modeled by these current sheets is screened from the plasma by a sheath of anisoptropic conductivity which shorts out locally the toroidal radio frequency electric field but does not affect the poloidal radio frequency electric field. The plasma near the antenna is modeled by its cold dielectric tensor having an inhomogeneous density and applied magnetic field. The field analysis for the coupling and power flow is carried out in a slab geometry. DOE

N82-11934# Mississippi State Univ., Mississippi State. Energy Center.
MAGNETOHYDRODYNAMIC RESEARCH PROGRAM OF THE MHD ENERGY CENTER AT MISSISSIPPI STATE UNIVERSITY AND STRUCTURAL FEATURES OF MHD RADIANT BOILERS
W. S. Shepard 1981 53 p Lectures presented to MHD/HRSR Sci. and Engr. of the Peoples Republic of China, 10-31 Jul. 1981
(Contract DE-AC02-80ET-15601)
(DE81-029901; DOE/ET-15601/T3; TR-3) Avail: NTIS HC A04/MF A01

Magnetohydrodynamic is conducted largely through use of test stand which simulates conditions in the MHD gas stream. Continual modification of the test stand to reflect experimental results produced a test stand capable of test runs of 100 hours; runs of more than 500 hours are planned. The test stand is described, and experimental results are discussed. The design and construction of MHD radiant boiler are described. The radiant furnance serves several functions in a heat recovery and seed recovery system; it cools flue gases to a temperature suitable for entrance to the secondary superheater; it generates steam; it provides for the removal of molten ash at high temperatures; and it provides access for intrusive and nonintrusive instrumentation to the gas-side environment. DOE

N82-11935# Massachusetts Inst. of Tech., Cambridge. Plasmas Fusion Center.
RF-DRIVEN TOKAMAK REACTOR WITH SUB-IGNITED, THERMALLY STABLE OPERATION
L. P. Harten, A. Bers, V. Fuchs, (IREQ, Varennes, Canada), and M. M. Shoucri, (IREQ, Varennes, Canada) Feb. 1981 9 p refs Presented at the 4th Topical Conf. on RF Heating of Plasma, Austin, Tex., Feb. 1981
(Contract DE-AC02-76ET-51013)
(DE81-029437; DOE/ET-51013/8; PFC/RR-81-6) Avail: NTIS HC A02/MF A01

A Radio-Frequency Driven Tokamak Reactor (RFDTR) can use RF-Power, programmed by a delayed temperature measurement, to thermally stabilize a power equilibrium below ignition, and to drive a steady state current. We propose the parameters for such a device generating approx. = 1600 MW thermal power and operating with Q approx. = 40 (= power out/power in). A one temperature zero-dimensional model allows simple analytical formulation of the problem. The relevance of injected impurities for locating the equilibrium is discussed. We present the results of a one-dimensional (radial) code which includes the deposition of the supplementary power, and compare with out zero-dimensional model. DOE

N82-11936# KMS Fusion, Inc., Ann Arbor, Mich.
TRITIUM INDUCED X-RAY EMISSION FROM GLASS SHELL INERTIAL FUSION TARGETS
Susan M. Alexander, Richard J. Simms, and Paul R. Anderson 1981 15 p refs Presented at the Conf. on X- and Gamma-ray Sources and Appl., Ann Arbor, Mich., 10 Jun. 1981
(Contract DE-AC08-78DP-40030)
(DE81-025599; KMSF-U-1097; CONF-810647-7) Avail: NTIS HC A02/MF A01

Spherical glass shells filled with fuel mixtures of deuterium, tritium, and occasionally additional gases are required as targets for the inertial fuson program. Accurate knowledge of the amount of tritium and other gases contained in the shell is necessary. The X ray spectrum resulting from the interaction of beta particles with the constituents of the glass shell and gas fill is analyzed. A method is presented to reduce the effort required to relate X-ray yield to tritium content. DOE

N82-11937# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
PRODUCTION AND CHARACTERIZATION OF PURE CRYOGENIC INERTIAL FUSION TARGETS
B. A. Boyd (General Research Corp., Fort Walton Beach, Fla.) and Gary W. Kamerman 1981 6 p refs Presented at the IECEC Conf., Atlanta, 9 Aug. 1981
(Contract DE-AC08-79DP-40083)
(DE81-025920; DOE/DP-40083/9; CONF-810812-30) Avail: NTIS HC A02/MF A01

An experimental cryogenic inertial fusion target generator and two optical techniques for automated target inspection are described. The generator produces 100 microns diameter solid hydrogen spheres at a rate compatible with fueling requirements of conceptual inertial fusion power plants. A jet of liquified hydrogen is disrupted into droplets by an ultrasonically excited nozzle. The droplets solidify into microspheres while falling through a chamber maintained below the hydrogen triple point pressure. Stable operation of the generator has been demonstrated for up to three hours. The optical inspection techniques are computer aided photomicrography and coarse diffraction pattern analysis (CDPA). The photomicrography system uses a conventional microscope coupled to a computer by a solid state camera and digital image memory. The computer enhances the stored image and performs feature extraction to determine pellet parameters. The CDPA technique uses Fourier transform optics and a special detector array to perform optical processing of a target image. DOE

N82-11938# California Univ., Livermore. Lawrence Livermore Lab.
STIMULATED RAMAN SCATTERING IN LARGE PLASMAS

Donald W. Phillion and David L. Banner 6 Nov. 1980 45 p refs Presented at 22nd Ann. Meeting of the Div. of Plasma Phys. of the Am. Phys. Soc., San Diego, Calif., 10-14 Nov. 1980 Submitted for publication
(Contract W-7405-eng-48)
(DE81-026589; UCRL-84854; CONF-801119-7) Avail: NTIS HC A03/MF A01

Stimulated Raman scattering is of concern to laser fusion since it can create a hot electron environment which can increase the difficulty of achieving high final fuel densities. In earlier experiments with one micron laser light, the energy measured in Raman-scattered light has been insignificant. But these experiments were done with, at most, about 100 joules of laser energy. The Raman instability has a high threshold which also requires a large plasma to be irradiated with a larger diameter spot. Only with a long interaction length can the Raman-scattered light wave convectively grow to a large amplitude, and only in recent long pulse, high energy experiments (4000 joules in 2 ns) at the Shiva laser facility have we observed as much as several percent of the laser light to be Raman-scattered. We find that the Raman instability has a much lower intensity threshold for longer laser pulselength and larger laser spot size on a solid target. DOE

N82-11939# California Univ., Livermore. Lawrence Livermore Lab.
PLASMA CONFINEMENT IN THE TMX TANDEM MIRROR
E. B. Hooper, Jr., S. L. Allen, T. A. Casper, J. F. Clauser, P. Coakley, F. H. Coensgen, D. L. Correll, W. F. Cummins, J. C. Davis, and R. P. Drake 29 Apr. 1981 5 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-18 Sep. 1981
(Contract W-7405-eng-48)
(UCRL-85883; CONF-810906-2) Avail: NTIS HC A02/MF A01

Axially confining potentials are shown to exist throughout the central 20-cm core of the tandem mirror experiment. Axial electron-confinement time is up to 100 times that of single-cell mirror machines. Radial transport of ions is smaller than axial transport near the axis. It has two parts at large radii: nonambipolar, in rough agreement with predictions from resonant-neoclassical transport theory, and ambipolar, observed near the plasma edge under certain conditions, accompanied by a low-frequency, m = 1 instability or strong turbulence. DOE

N82-11940# California Univ., Livermore. Lawrence Livermore Lab.
ONE-DIMENSIONAL MAGNETOHYDRODYNAMIC CALCULATIONS OF A HYDROGEN-GAS PUFF
S. Maxon and P. D. Nieldsen 20 Apr. 1981 5 p refs Presented at the 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-19 Sep. 1981
(Contract W-7405-eng-48)
(UCRL-85867; CONF-810906-1) Avail: NTIS HC A02/MF A01

A one-dimensional Lagrangian calculation of the implosion of a hydrogen gas puff is presented. At maximum compression, 60% of the mass is located in a density spike .5 mm off the axis with a half width of 40 micrometers. The temperature on axis reaches 200 eV. DOE

N82-11941# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
SOURCE-TO-INCIDENT-FLUX RELATION IN A TOKAMAK BLANKET MODULE
G. R. Imel 1981 4 p refs Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7-12 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026524; CONF-810606-82) Avail: NTIS HC A02/MF A01

The next-generation Tokamak experiments, including the Tokamak fusion test reactor (TFTR), will utilize small blanket modules to measure performance parameters such as tritium breeding profiles, power deposition profiles, and neutron flux profiles. Specifically, a neutron calorimeter (simply a neutron moderating blanket module) which permits inferring the incident 14 MeV flux based on measured temperature profiles was proposed for TFTR. The problem of how to relate this total scalar flux to the fusion neutron source is addressed. This relation is necessary since the calorimeter is proposed as a total fusion energy monitor. The methods and assumptions presented was valid for the TFTR Lithium Breeding Module (LBM), as well as other modules on larger Tokamak reactors. DOE

N82-11942# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
PRELIMINARY ACTIVATION CALCULATIONS FOR THE POLOIDAL DIVERTOR EXPERIMENT
J. L. Judd, A. J. Scott, D. W. Higg, and T. S. Bohn 1981 6 p refs Presented at the Am. Nucl. Soc. Ann. Meeting, Miami Beach, Fla., 7-12 Jun. 1981
(Contract DE-AC07-76ID-01570)
(DE81-026525; CONF-810606-80) Avail: NTIS HC A02/MF A01

The poloidal divertor experiment (PDX) Tokamak is being operated to study plasma cross section shaping, high power neutral beam heating, and divertor control of plasma impurities in Tokamaks. Experiments to date were performed at relatively low power, but with 6 MW of neutral beam power eventually available, high D-D plasma reaction rates are expected that will yield up to 10 to the 15th power 2.45-MeV neutrons per pulse. This neutron emission level is high enough to cause significant neutron-induced machine activation that must limit the occupancy time of personnel entering the room to repair or change parts. The dose rate depends on the location in the room and, of course, the pulsing history prior to entry. One dimensional activation calculations are described that were done for PDX to provide preliminary dose rate information for various times after shutdown following one week of high power operation. DOE

N82-11943# KMS Fusion, Inc., Ann Arbor, Mich.
GAS-JET LASER-PLASMA INTERACTION EXPERIMENTS
Frederick J. Mayer, Mark A. Buoniconto, Garland E. Busch, Gary C. Castella, George Charatis, Mark Herbst, Daniel K. Jarrell, Dennis L. Matthews, Barrett Ripin, Robert J. Schroeder et al 1981 3 p ref Presented at the Conf. on Lasers and Electro-Optics, Washington, D.C., 10 Jun. 1981 Submitted for publication
(Contract DE-AC08-78DP-40030)
(DE81-027169; KMSF-U-1087) Avail: NTIS HC A02/MF A01

Preliminary results of laser-plasma interaction studies at 1.06 and 0.53 microns with gas-jet targets are presented. Stimulated Brillouin backscatter is strong in the 100 microns scale-length plasmas, but sidescatter is weak. Temperature, transport, and absorption measurements are discussed. DOE

N82-11944# Los Alamos Scientific Lab., N. Mex.
UNCERTAINTIES ASSOCIATED WITH INERTIAL-FUSION IGNITION
Gene H. McCall 1981 10 p refs Presented at the Conf. on Optics, Santa Fe, N. Mex., Apr. 1981
(Contract W-7405-eng-36)
(DE81-025408; LA-UR-81-1750; CONF-81-429-34) Avail: NTIS HC A02/MF A01

An estimate is made of a worst case driving energy which is derived from analytic and computer calculations. The uncertainty can be reduced by a factor of 10 to 100 if certain physical effects are understood. That is not to say that the energy requirement can necessarily be reduced below that of the worst case, but it is possible to reduce the uncertainty associated with ignition energy. With laser costs in the $0.5 to 1 billion per MJ range, it can be seen that such an exercise is worthwhile. DOE

N82-11945# Los Alamos Scientific Lab., N. Mex.
HEATING OF A DENSE PLASMA WITH AN INTENSE RELATIVISTIC ELECTRON BEAM: INITIAL OBSERVATIONS
M. D. Montgomery, J. V. Parker, K. B. Riepe, and R. L. Sheffield 1981 9 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29 Jun. - 3 Jul. 1981
(Contract W-7405-eng-36)
(DE81-025348; LA-UR-81-1860; CONF-810620-8) Avail: NTIS HC A02/MF A01

A dense (approximately 0 to the 17th power/cu cm) plasma

was heated via the relativistic two-stream instability using a 3 MeV, intense (5 x 10 to the 5th power A/sq cm) electron beam. Evidence for heating was obtained with diamagnetic loops, thin-foil witness plates, and a 2-channel, broad-band soft X-ray detector. Measurements of energy loss from the beam using calorimetry techniques were attempted. The measured strong dependence of heating on beam transverse temperature and the very short interaction length (< 4 cm) are consistent with beam-plasma coupling due to the relativistic electron-electron two-stream instability. Soft X-ray measurements made > 100 ns after the beam pulse are consistent with a plasma temperature < 150 eV and line emission near 80 to 90 eV. DOE

N82-11946# Los Alamos Scientific Lab., N. Mex.
MAXIMAL ENTROPY IN FLUID AND PLASMA TURBULENCE: A REVIEW
David Montgomery 1981 21 p refs Presented at the Workshop on Maximum Entropy Estimation and Data Analysis, Laramie, Wyo., 8 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025388; LA-UR-81-1697; CONF-8106116-1) Avail: NTIS HC A02/MF A01

Three applications of maximal entropy procedures to models of turbulence in plasmas are described. They are: (1) the calculation of most probable states in guiding-center plasmas and vortex fluids; (2) the calculation of most probable magnetohydrodynamic equilibrium profiles; and (3) the prediction of absolute equilibrium Gibbs ensemble spectra for Navier-Stokes fluids. Further conjectures on the role of entropies in turbulence theories are offered. DOE

N82-11947# Westinghouse Electric Corp., Pittsburgh, Pa. Research and Development Center.
DEVELOPMENT, TESTING, AND EVALUATION OF MHD MATERIALS AND COMPONENT DESIGNS. VOLUME 1: EXECUTIVE SUMMARY Final Report, 15 Oct. 1973 - 31 Dec. 1975
W. E. Young Nov. 1980 44 p refs
(Contract DE-AC01-76ET-10805)
(DE81-026203; DOE/ET-10805/T1-Vol-1; FE-1540-29-Vol-1) Avail: NTIS HC A03/MF A01

Results of studies on gas electrical properties, coal combustion, and MHD materials intended to support the Waltz Mill channel experiments are presented. Materials testing indicated that stabilized zirconia should be an acceptable electrode material. Cyclone coal combustors were studied and designs developed for a Waltz Mill size unit and a 25,000 lb/h prototype. The Waltz Mill facility performed in a highly satisfactory manner. Six non generating and 16 load tests were made on three channels. Following a failure of the air heater tests were run essentially on materials and structure. The system was dismantled and reconstruction started to enable testing at the proposed Component Development Integrated Facility. A very successful 127-hour run was made on a pair of US designed and constructed MHD electrode modules in the Soviet Union's U-02 facility. DOE

N82-11948# Oak Ridge National Lab., Tenn.
PLASMA ASSESSMENTS FOR THE FUSION ENGINEERING DEVICE (FED)
Y. K. M. Peng, P. H. Rutherford (Princeton Univ.), J. F. Lyon, D. Blackfield (MIT), S. K. Borowski (Michigan Univ.), D. R. Cohn (MIT), L. M. Hively (General Electric Co.), J. A. Holmes, W. A. Houlberg, H. C. Howe et al 1981 13 p refs Presented at the Symp. of Phys. Probl. of Fusion Reactors, Trieste, Italy, 2 Jun. 1981
(Contract W-7405-eng-26)
(DE81-024254; CONF-810680-2) Avail: NTIS HC A02/MF A01

An initial range of plasma assumptions and scenarios for the US Tokamak FED concept is examined. The results suggest that the current FED baseline parameters are appropriate for achieving its nominal goals of P(fusion) approx. = 180 MW and a plasma Q > or = to 5 for a pulse length greater than 100 s. However, large uncertainty still exists in the areas of current startup, ion-cyclotron wave launching, influence of plasma shape on achievable beta, impurity control, plasma edge transport, and plasma disruption. Various options and remedies to alleviate the impact of the uncertainty on the FED design concept are suggested. DOE

N82-11949# Oak Ridge National Lab., Tenn. Engineering Physics Div.
CALCULATION PROCEDURES FOR THE ANALYSIS OF INTEGRAL EXPERIMENTS FOR FUSION-REACTOR DESIGN
R. T. Santoro, J. M. Barnes, R. G. Alsmiller, Jr., and E. M. Oblow Jul. 1981 48 p refs
(DE81-027626; ORNL-5777) Avail: NTIS HC A03/MF A01

The calculational models, nuclear data, and radiation transport codes that are used in the analysis of integral measurements of the transport of approximately 14 MeV neutrons through laminated slabs of materials typical of those found in fusion reactor shields are described. The two dimensional discrete ordinates calculations to optimize the experimental configuration of reducing the neutron and gamma ray background levels and for obtaining and equivalent, reduced geometry of the calculational model to reduce computer core storage and running times are also presented. The equations and data to determine the energy-angle relations to neutrons produced in the reactions of 250 keV deuterons in a titanium tritide target are given. The procedures used to collapse the 17In 36gamma VATAMIN C cross section library to a 53n 21 gamma broad group library are described. DOE

N82-11950# Oak Ridge National Lab., Tenn. Fusion Energy Div.
PHYSICS CONSIDERATIONS FOR THE FED LIMITER
H. C. Howe Jul. 1981 36 p refs
(Contract W-7405-eng-26)
(DE81-027596; ORNL/TM-7803) Avail: NTIS HC A03/MF A01

The scrapeoff plasma and its interaction with a pumping limiter is reviewed. The governing equations for heat and particle transport in the scrapeoff are solved analytically with several simplifying assumptions. The assumed scrapeoff model is presented. A shape for the limiter, which has a uniform heat loading on the front surface is derived. The assumed crossfield transport coefficient is varied to examine the sensitivity of the heat loading to variations in plasma scrapeoff thickness. The heat flux to the limiter leading edge is an extremely sensitive function of variations in scrapeoff thickness. Uncertainties in the plasma crossfield transport preclude derivation of a believable limiter shape. Problems involved with an edgeless, perforated limiter and with a global limiter are discussed. A flat-plate limiter with the heat flux to the leading edge controlled by major radius motion of the plasma is proposed. DOE

N82-11951# Sandia Labs., Albuquerque, N. Mex.
COATED-LIMITER TESTING IN TOKAMAKS
J. B. Whitley, A. W. Mullendore, D. M. Mattox, P. W. Trester (General Atomic Co.), and L. C. Emerson (Oak Ridge National Lab.) 1981 7 p refs Presented at the Fusion Reactor Mater. Meeting, Seattle, 9 Aug. 1981
(Contract DE-AC04-76DP-00789)
(DE81-027665; SAND-81-0270C; CONF-810831-5) Avail: NTIS HC A02/MF A01

Over the past year, extensive operating experience was gained with coated graphite limiters in the ISX-B and Doubler III Tokamaks. A total of approximately 20,000 Tokamak discharge were performed with TIC coated limiters, and the plasma performance and capability with these limiters improved over that obtained with metallic limiters. While none of the limiters failed in service, the TIC coating and in some cases the graphite substrate experienced damage. This damage consists of grooves formed in the coating and an area of coating melt and graphite cracking. The groove damage is believed to have been caused by disruptions and the melt region by the high heat loads during neutral beam heated discharges. DOE

N82-11952# Sandia Labs., Albuquerque, N. Mex.
SHOCK EFFECTS IN PARTICLE-BEAM FUSION TARGETS
M. A. Sweeney, F. C. Perry, J. R. Asay, and M. M. Widner 1981 5 p refs Presented at the APS Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23 Jun. 1981
(Contract DE-AC04-76DP-00789)

(DE81-027806; SAND-80-2870C; CONF-810684-41) Avail: NTIS HC A02/MF A01

The response of fusion target materials to shock loading is assessed. The particle beam accelerators HYDRA and PROTO I and the gas gun facility were utilized. Nonlinear shock-accelerated unstable growth of fabrication irregularities were demonstrated, and jetting was found to occur in imploding targets because of asymmetric beam deposition. Cylindrical ion targets display an instability due either to beam or target nonuniformity. However, the data suggest targets with aspect ratios of 30 may implode stably. The first time- and space-resolved measurments of shock-induced vaporization were made. A homogeneous mixed phase EOS model cannot adequately explain the results because of the kinetic effects of vapor formation and expansion. DOE

N82-11953# Sandia Labs., Albuquerque, N. Mex.

SCALABILITY OF LIGHT ION BEAMS TO REACH FUSION CONDITIONS

G. W. Kuswa, J. P. Quintenz, D. B. Seidel, D. J. Johnson, C. W. Mendel, Jr., E. J. T. Burns, D. Fehl, R. J. Leeper, F. C. Perry, and P. A. Miller 1981 26 p refs Presented at the 4th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., Palaiseau, France, 29 Jun. 1981

(Contract DE-AC04-76DP-00789)

(DE81-024443; SAND-81-0672C; CONF-810620-12) Avail: NTIS HC A03/MF A01

Two variations of an intense ion beam diode having magnetic insulation generated either by an external capacitor bank (radial ion diode) or by diode current passing through coil-like vanes, (AMPFION) are described. Advantages in energy delivery and focusability make AMPFION the best candidate for attaining ignition. DOE

N82-11954# Wisconsin Univ., Madison. Dept. of Nuclear Engineering.

MAGNETS FOR THE TANDEM MIRROR FUSION POWER REACTOR WITAMIR-I

W. Maurer, (Kernforschungszentrum, Karlsruhe), D. C. Larbalestier, and I. N. Sviatoslavsky Mar. 1981 7 p refs Presented at the 7th Intern. Conf. on Magnet Technol., Karlsruhe, West Germany, 30 Mar. - 3 Apr. 1981 Submitted for publication

(Contract DE-AS02-78ET-52048)

(DE81-025568; UWFDM-408; CONF-810340-14; DOE/ET-52048/17) Avail: NTIS HC A02/MF A01

The design of the magnet system for the Tandem Mirror Fusion Power Reactor WITAMIR-I is presented. The central cell of this reactor consists of 34 dc solenoid magnets with a diameter of about 8 m, spaced over a length of 165 m; the central cell magnetic field is 3.6 T. The design of these magnets is relatively simple. The requirements of the end plug magnets are more stringent. In our concept each end plug consists of one barrier mirror solenoid coil, of 3.4 m inner diameter, producing an on axis field of 14 T, two transition coils and a yin-yang pair with a maximum plug field of 6 T and a plug mirror ratio of 1.5. NbTi can be used for all coils except the high field plug solenoid for which Nb3Sn is needed. DOE

N82-11955# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

MAGNETIC FUSION ENERGY PROGRAM, VOLUME 1 Annual Report, 1 Oct. 1979 - 30 Sep. 1980

R. E. Aamodt, P. J. Catto, D. A. DIppolito, X. S. Lee, J. R. Myra, P. H. Diamond, J. M. Ogden, W. M. Tang, D. C. Baxter, R. N. Byrne et al Dec. 1980 261 p refs 2 Vol.

(Contract DE-AC03-79ET-53057)

(SAI-254-80-656-LJ-Vol-1; PRI-20-Vol-1) Avail: NTIS HC A12/MF A01

Results of theoretical studies of instabilities in magnetic mirror configurations are reported. Emphasis is placed on equilibrium and stability investigations. The loss rate for the electrostatically confined species in mirrors is also addressed. DOE

N82-11956# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

MAGNETIC FUSION ENERGY PROGRAM, VOLUME 2 Annual Report

R. E. Aamodt, P. J. Catto, D. A. DIppolito, X. S. Lee, J. R. Myra, P. H. Diamond, J. M. Ogden, W. M. Tang, D. C. Baxter, R. N. Byrne et al Dec. 1980 265 p refs 2 Vol.

(Contract DE-AC03-79ET-53057)

(SAI-254-80-656-LJ-Vol-2) Avail: NTIS HC A12/MF A01

Tokamak stability, EBT transport, and FRX equilibria were investigated. Results are summarized. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-11957 Washington Univ., Seattle.

VIBRATIONAL SPECTRA AND ATOM-ATOM POTENTIALS IN THE CRYSTALLINE STATE. 1: A COMPARISON OF HEXASULFUR, OCTASULFUR AND DODECASULFUR. 2: A STUDY OF SOLID ALLENE Ph.D. Thesis

Frederick Joseph Silbereis 1981 229 p

Avail: Univ. Microfilms Order No. 8121244

The potentials between atoms of different molecules in a crystal are studied. They are taken to be of the 8 exp form, with a coulombic term added in some cases. An atom-atom potential developed for octasulfur is used to predict the molecular vibrations of hexasulfur, octasulfur, and dodecasulfur in the crystalline state. The fit for hexasulfur is unsatisfactory so that a different potential (but of the same form) is proposed which fits much better, however, neither potential is clearly favored in its application to dodecasulfur. In all calculations, both internal vibrations and lattice vibrations are included and can interact. This interaction, or mixing, is seen to be negligible for hexasulfur and minor for octasulfur, but quite significantly for dodecasulfur. The complete infrared and Raman spectra (down to about 30 wave numbers) of solid allene at 77 K are presented.

Dissert. Abstr.

N82-11958*# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.

GROWTH OF SOLID SOLUTION SINGLE CRYSTALS Final Report

August F. Witt Oct. 1981 12 p refs

(Contract NAS8-32994)

(NASA-CR-161891) Avail: NTIS HC A02/MF A01 CSCL 20B

The bulk growth of HgCdTe crystals by modified Bridgman techniques and by quenching anneal recrystallization yields deficient material. The primary complication for growth arises from a pronounced tendency for constitutional supercooling caused by the characteristics of the phase diagram and from the high vapor pressure of Hg. Unseeded and seeded Bridgman growth are considered from the viewpoints of: (1) backmelting of a solid charge; (2) equilibration prior to regrowth; and (3) the growth process. A growth system developed to restrict the thermal gradient region in the melt is described which is based on differentially operated heat pipes (isothermal regions) separated by an (adiabatic) gradient region, this permits maximized radial thermal gradient control, which is desirable for the establishment of a planar solidification isotherm. A.R.H.

N82-11959*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical Computer and Systems Engineering.

LOW TEMPERATURE GROWTH AND ELECTRICAL CHARACTERIZATION OF INSULATORS FOR GAAS MISFETS Semiannual Status Report, 1 May - 31 Oct. 1981

J. M. Borrego and S. K. Ghandhi 31 Oct. 1981 11 p

(Contract NAG3-175)

(NASA-CR-164972) Avail: NTIS HC A02/MF A01 CSCL 20B

Progress in the low temperature growth of oxides and layers on GaAs and the detailed electrical characterization of these oxides is reported. A plasma anodization system was designed, assembled, and put into operation. A measurement system was assembled for determining capacitance and conductance as a function of gate voltage for frequencies in the range from 1 Hz to 1 MHz. Initial measurements were carried out in Si-SiO2

capacitors in order to test the system and in GaAs MIS capacitors abricated using liquid anodization. J.M.S.

N82-11960# Ben Gurion Univ. of the Negev, Beersheva (Israel). Dept. of Physics.
DISLOCATION INDUCED NOISES IN SEMICONDUCTORS AT LOW AND HIGH TEMPERATURES Annual Technical Report, 1 Apr. 1980 - 1 Apr. 1981
Samson Milshtein May 1981 21 p refs
(Contract DAJA37-80-C-0067)
(AD-A104449; ATR-1) Avail: NTIS HC A02/MF A01 CSCL 20/12

This investigation was concentrated on better understanding of the dislocation structure involved in noise generation process. It is shown that noise power depends on unhomogeneities of dislocation structure especially on randomly distributed dislocation electrical barriers. The annealing of dislocation-point defect complexes does not influence the noise spectrum. It is difficult to find a proper explanation for this surprising result. GRA

N82-11961# Rockwell International Science Center, Thousand Oaks, Calif. Science Center.
THEORETICAL AND EXPERIMENTAL STUDIES OF THE ELECTRO-OPTIC EFFECT: TOWARD A MICROSCOPIC UNDERSTANDING Final Report, 1 Jun. 1980 - 31 May 1981
M. D. Ewbank and P. R. Newman Aug. 1981 92 p refs
(Contract N00014-80-C-0498; NR Proj. 372-909)
(AD-A104363; SC5266.1FR) Avail: NTIS HC A05/MF A01 CSCL 07/4

The electro-optic effect is investigated both theoretically and experimentally. The theoretical approach is based upon W.A. Harrison's 'Bond-Orbital Model'. The separate electronic and lattice contributions to the second-order, electro-optic susceptibility are examined within the context of this model and formulae which can accommodate any crystal structure are presented. In addition, a method for estimating the lattice response to a low frequency (dc) electric field is outlined. Finally, experimental measurements of the electro-optic effects in TeO2 and Tl3AsSe3 have been performed and the results of these measurements are presented. Author (GRA)

N82-11962# Army Electronics Research and Development Command, Fort Monmouth, N. J. Electronics Technology Devices Lab.
EVALUATION OF ALPHA ALUMINUM PHOSPHATE FOR ADVANCED ACOUSTIC WAVE DEVICES
John Gualtieri and Arthur Ballato Aug. 1981 51 p refs
(DA Proj. 1L1-62705-AH-94)
(AD-A104685; DELET-TR-81-15) Avail: NTIS HC A04/MF A01 CSCL 20/3

Alpha aluminum phosphate (berlinite) has been investigated as a highly piezoelectric material potentially suitable for use in advanced bulk and surface acoustic wave devices. Areas of investigation include: (1) crystal structure, (2) methods of crystal growth, (3) defects in structure, (4) the presence of water impurities, (5) piezoelectric resonators, and (6) the equivalent electrical circuit. Calculations have been carried out for frequency constant, piezoelectric coupling factor, and linear temperature coefficient as functions of orientation for general, doubly rotated plate orientations, and disclose quartz-like properties with coupling factors appreciably larger than quartz. Measurements indicate larger than expected losses, indicative of incorporation of impurities during growth; suggestions for further work are given.
Author (GRA)

N82-11963# Hughes Aircraft Co., Torrance, Calif.
FAILURE MECHANISM STUDY OF GaAs TECHNOLOGY Final Technical Report, 31 Aug. 1978 - 31 Aug. 1980
Lawrence S. Bowman and W. Tarn Griffiss AFB, N.Y. RADC Jul. 1981 202 p refs
(Contract F30602-78-C-0326; AF Proj. 2338)
(AD-A104440; W-43424; RADC-TR-81-180) Avail: NTIS HC A10/MF A01 CSCL 09/1

In this report we have discussed the characterization of the power FETs procured for this program and failure analysis of low noise devices, including wire bonding failures and environmental stress test failures. A method of etching gold while leaving the underlying refractory metals relatively unaffected was explained. An analysis of the Type A-6 low noise FET was given, in which a failure mode was discussed that involved possible channel doping compensation. Results were then presented on device failures from high and medium temperature stress tests on low noise FETs. A number of medium power devices were received from RADC for analysis. These were packaged FETs that had been subjected to various stresses at Texas Instruments on a RADC/TI reliability contract. Typically, the devices had failed during deliberate stressing to the maximum electrical limits or in temperature stress tests. Failure mechanism studies of two different ohmic contact metallizations showed that both fabrication procedures produced reliable contacts. Constant elevated temperature tests of gold-based gate diode FETs from two different manufacturers showed that one device type was considerably less prone to gate diode failure than the other, indicating the necessity of additional work on the gold gate versus aluminum gate reliability question. Failures were investigated that involve problems associated with gold contact pads overlaying aluminum gate pads with a refractory metal interface. Finally, temperature-accelerated studies of the resistance of aluminum gates were carried out. Author (GRA)

N82-11964# Rochester Univ., N. Y. Dept. of Chemistry.
LASER EXCITATION OF SURFACE ELECTRONIC STATES FOR A ONE-DIMENSIONAL SEMICONDUCTOR
William C. Murphy and Thomas F. George Sep. 1981 21 p refs Submitted for publication
(Contract N00014-80-C-0472; NR Proj. 056-749)
(AD-A104522; TR-13) Avail: NTIS HC A02/MF A01 CSCL 20/12

The electronic band structure of a finite one-dimensional semiconductor is examined. The surface states are identified and the absorption cross-section for transitions to these states is calculated. The use of a laser to enhance surface charge density is discussed. Author (GRA)

N82-11965# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
A STUDY OF METAL-SEMICONDUCTOR CONTACTS ON INDIUM PHOSPHIDE Final Technical Report, 1 Oct. 1979 - 30 Sep. 1980
G. Y. Robinson Jul. 1981 46 p refs
(Contract F19628-79-C-0016; AF Proj. 2306)
(AD-A104439; RADC-TR-81-169) Avail: NTIS HC A03/MF A01 CSCL 20/12

This report describes the research accomplished during the last twelve months of a 20-month program of research on metal contacts to the semiconductor indium phosphide (InP). The Schottky barrier energy phi sub B and the contact resistance r(c) were measured for several metal-InP structures and the electrical properties were correlated to the metallurgical properties obtained with Auger electron spectroscopy (AES). Separate measurement of phi sub B on both n-type and p-type InP was carried out using Al as the metal Electrode. Control samples of Al/GaAs and Al/Si diodes were fabricated simultaneously in order to evaluate fabrication procedures. The Al/InP diodes were rectifying and phi sub B(n) less than phi sub B(p), in agreement with our earlier work on Pd/InP diodes. Ohmic contacts to p-type InP were also investigated. The results of a study of a multilayered metal film consisting of Au and Be alloyed to the InP surface, are given. In was found that the Au/Be/p-InP structure when properly heat treated would produce ohmic behavior with r(c) = 0.001 ohm sq cm at a net doping of about 1.0 x 10 to the 17th power per cu cm and r(c) = 0.0002 ohm sq cm at 1.4 x 10 to the 18th power per cu cm. The Au/Be contact was relatively easy to apply but tight control over the Au/Be thickness ratio and heat-treatment cycle was found to be necessary. Author (GRA)

N82-11966# Lehigh Univ., Bethlehem, Pa. Dept. of Physics.
NEGATIVE-U FOR POINT DEFECTS IN SILICON
G. D. Watkins, A. P. Chatterjee, and R. D. Harris Sep. 1980 7 p refs Presented at the Intern. Conf. on Defects and Radiation Damage in Semiconductors, Oiso, Japan, Sep. 1980
(Contract N00014-76-C-1097)
(AD-A104482) Avail: NTIS HC A02/MF A01 CSCL 20/2

New evidence is presented that the lattice vacancy and

interstitial boron in silicon are negative-U systems: (1) the equilibrium charge state for the vacancy in low resistivity p-type material is confirmed to be V++. (2) The metastable donor level for interstitial boron at Ec-0.12 eV is detected in a novel photo-DLTS experiment confirming its negative-U properties.
Author (GRA)

N82-11967# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Physics.
SURFACE-ENHANCED NONLINEAR OPTICAL EFFECTS AND DETECTION OF ADSORBED MOLECULAR MONOLAYERS
Y. R. Shen, C. K. Chen, T. F. Heinz, and D. Richard 1981 9 p refs Presented at 5th Intern. Conf. on Laser Spectry., Alberta, British Columbia, 29 Jun. 1981
(Contract W-7405-eng-48)
(DE81-027097; LBL-12930; CONF-8106100-3) Avail: NTIS HC A02/MF A01

The observed of a number of surface enhanced nonlinear optical effects is discussed. The feasibility of using second harmonic generation to detect the absorption of molecular monolayers on a metal surface in an electrolytic solution is shown. DOE

N82-11968# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
SPECTRUM OF FOUR-TIMES IONIZED NIOBIUM, INCLUDING ZEEMAN STUDIES OF SELECTED LINES AND LASER MODIFICATION OF THE POPULATION OF CERTAIN LEVELS IN A SLIDING SPARK SOURCE
David T. Kagan Jun. 1981 93 p refs
(Contract W-7405-eng-48)
(DE81-027554; LBL-12822) Avail: NTIS HC A05/MF A01

The 4p6nl spectrum of Nb(4+) was measured and analyzed. The spectrum was excited in a vacuum sliding spark source with a peak current of 800 amperes and a pulse width of 70 microseconds. The analysis of the spectrum has extended the 13 known lines to 84 and the 10 known levels to 30. The ionzation energy was estimated to be 407897 cm/l. There is strong evidence that the 4p5 4d2 configuration interacts strongly with the 4p6 nf configuration. In addition, the hyperfine splitting of the 4p6 6s level has been observed and measured to be 1.1 cm/l. An attempt was made to examine the Zeeman spectrum of selected lines of Nb(4+). However, the Doppler broadening of the lines prevented the acquisition of good results. A complete discussion of the Zeeman effect in the Nb(4+) spectrum is contained in the test. In addition, the ability of a laser to modify the population of certain atomic levels in the sliding spark source was investigated. DOE

N82-11969# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
CLASSICAL FIELD THEORY WITH Z(3) SYMMETRY
Herbert M. Ruck Jun. 1981 9 p refs Presented at the Center for Nonlinear Studies Conf., Nonlinear Probl.: Present and Future, Los Alamos, N. Mex., 2-6 Mar. 1981
(Contract W-7405-eng-48)
(DE81-027089; LBL-12852; CONF-810385-2) Avail: NTIS HC A02/MF A01

Solutions and some of their properties of a classical vector field model in two-dimensional Minkowski space with internal symmetry Z(3)- the cyclic group of order three are presented. DOE

N82-11970# Argonne National Lab., Ill.
ELECTRONIC STRUCTURE AND MANY-BODY EFFECTS IN Pd
G. W. Crabtree, D. H. Dye, S. A. Campbell, J. B. Ketterson (Northwestern Univ.), J. J. Vuillemin (Arizona Univ., Tuscon), and N. B. Sandesara (Arizona Univ., Tucson) 1980 6 p refs Presented at Intern. Conf. on Phys. of Transition Metals, Leeds, England, 18-22 Aug. 1980
(Contract W-31-109-eng-38)
(DE81-023110; CONF-800864-3) Avail: NTIS HC A02/MF A01

Phase shift parametrization for the Fermi surface properties of Pd was constructed using extremal orbital areas and cyclotron masses measured with the de Haas-van Alphen effect. DOE

N82-11971# Los Alamos Scientific Lab., N. Mex.
QUASI-ELASTIC HIGH-PRESSURE WAVES IN 2024 Al AND Cu
C. E. Morris, J. N. Fritz, and B. L. Holian 1981 6 p refs Presented at the Conf. on Shock Waves in Condensed Matter, Menlo Park, Calif., 23-25 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025334; LA-UR-81-1897; CONF-810684-29) Avail: NTIS HC A02/MF A01

Release waves from the back of a plate slap experiment are used to estimate the longitudinal modulus, bulk modulus, and shear strength of the metal in the state produced by a symmetric collision. The velocity of the interface between the metal target and a window material is measured by the axially symmetric magnetic probe. Wave Profiles for initial states up to 90 GPa for 2024 Al and up to 150 GPa for Cu have been obtained. Elastic perfectly-plastic theory cannot account for the results. A relatively simple quasi-elastic plastic model can. DOE

N82-11972# Stanford Linear Accelerator Center, Calif.
OXIDE EFFECTS ON PHOTOEMISSION FROM HIGH CURRENT GaAs PHOTOCATHODES
E. L. Garwin, R. E. Kirby, and A. Roder Mar. 1981 18 p refs Presented at the Interdisciplinary Surface Sci. Conf., Liverpool, 6-9 Apr. 1981
(Contract DE-AC03-76SF-00515)
(DE81-025129; SLAC-Pub-2715; CONF-810495-2) Avail: NTIS HC A02/MF A01

The failure modes of the GaAs (100) photocathodes (PC's) are characterized. Gradual decreases in electron polarization and intensity are attributed to the physisorption of CO2 on the PC's during running at LN2 temperatures. Such PC's can be rejuvenated by warming to 90 K, i.e., above the CO2 desorption temperature. These PC's recover 90% of their original intensity. A second well characterized failure mode results from overheating the PC during in situ heat cleaning prior to activation. In this mode, AS is preferentially evaporated from the GaAs, leaving a Ga2O2 layer on the surface. This effect has been studied by Auger electrico spectrometry sputter profiling which indicates that the substantial thickness of the oxide layer blocks photoemission. These PC's may only be recovered by chemically removing the oxide layer. A third mode which is not as well characterized appears for thin Ga oxide layers. Properties of these PC's include reduced emission and the presence of a cutoff bias level. Such PC's are also not recoverable in situ. DOE

N82-11973# Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
MOLECULAR DYNAMICS SIMULATION OF GRAIN-BOUNDARY DIFFUSION OF VACANCIES IN bcc IRON
Thomas Kwok, P. S. Ho (IBM Watson Research Center), S. Yip, R. Balluffi, A. W. Brokman, and P. D. Bristowe Jun. 1981 14 p refs
(Contract DE-AS02-78ER-05002)
(DE81-025540; DOE/ER-05002/T2; COO-5002-22) Avail: NTIS HC A02/MF A01

The jumping of vacancies in a bcc iron sigma = 5 tilt boundary was simulated by computer molecular dynamics. The data yielded a reasonable value of the activation energy for migration and showed that the jump processes are highly structure dependent. The use of a temperature dependent transition probability matrix to describe the diffusion of the vacancies in the grain boundary is suggested. Formation of one type of boundary interstitial was observed which was found to be immobile. DOE

N82-11974# Sandia Labs., Albuquerque, N. Mex.
TRAPPING AND RELEASE OF IMPLANTED D/H IONS IN FUSED SILICA
G. W. Arnold and B. L. Doyle 1981 16 p refs Presented at the 9th Intern. Conf. on Atomic Collisions in Solids, Lyon, 6 Jul. 1981
(Contract DE-AC04-76DP-00789)
(DE81-024441; SAND-81-0850C; CONF-810728-1) Avail: NTIS HC A02/MF A01

Elastic recoil detection techniques were used to measure

hydrogen isotope profiles in fused silica implanted with 20 keV H and/or D ions. Saturation for both H and D implantations at concentrations of 2.1 x 10 to the 21st power ions/cu cm in good agreement with results of gas loading experiments. ETIR measurements indicate that most of the implanted H bonds are in the form of OH. Theoretical analyses using the local mixing model of H trapping provide a good fit to the saturation behavior and subsequent H movement toward the surface. Isochronal annealing shows that both H and D are released in a single stage centered about 550 C. The best theoretical fit is for a 1.9 eV H trap activation energy. DOE

N82-11975# National Bureau of Standards, Washington, D.C.
SEMICONDUCTOR MEASUREMENT TECHNOLOGY: THE RELATIONSHIP BETWEEN RESISTIVITY AND DOPANT DENSITY FOR PHOSPHORUS AND BORON DOPED SILICON Final Report
W. R. Thurber, R. L. Mattis, Y. M. Liu, and J. J. Filliben May 1981 58 p refs
(ARPA Order 2397)
(PB81-221327; NBS-SP-400-64; LC-81-600052) Avail: NTIS HC A04/MF A01 CSCL 20L

Data have been obtained for the resistivity dopant density relationship for silicon doped with phosphorus or boron for dopant densities in the range 10 to the 13th power to 10 to the 20th power/cu cm. For dopant densities less than 10 to the 18th power/cu cm, results were calculated from resistivity and junction capacitance voltage measurements on processed waters. For more heavily doped material, data were obtained from Hall effect and resistivity measurements on specimens cut from bulk silicon slices. GRA

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-11976# Language Services, Knoxville, Tenn.
DECAY HEAT CURVE EVALUATION TEST
M. Akiyama, K. Doda, T. Ida, H. Hashidura, M. Oka, and N. Yasu Mar. 1981 62 p refs Transl. into ENGLISH of Rept. UTNL-R-0103 Tokyo Univ., Japan, Mar. 1981 50 p Sponsored by DOE Prepared for ORNL
(DE81-027181; ORNL-tr-4764; UTNL-R-0103) Avail: NTIS HC A04/MF A01

Fission-product decay energy release rates were measured for fast neutron fissions of U-235, Pu-239, U-238, Th-232 and natural uranium for gamma-ray, and U-235 and Pu-239 for beta-ray. Gamma-ray energy spectra were measured using a NaI scintillation detector and beta ray energy spectra were obtained using a plastic scintillation detector combined with a transmission type proportional counter to eliminate gamma-ray effects. The measuremens were made covering times following irradiations from 19 to 24,000 seconds. The spectra data were integrated to provide total energy release rates as a function of time after fission. The present data of beta ray energy release rates are preliminary due to current carrying out of the data analyses. Typical uncertainties in the present data are approximately 5 percent (1 sigma) except for Th-232, and approximately 8 percent for Th-232. The present results were compared with the results of summation calculations using the TASAKA, ENDF/B-IV and JNDC decay data files. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-11977# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
THE INDIVIDUAL VERSUS THE COMPUTER: AN EXAMINATION OF ATTITUDE PROBLEMS AND THEIR IMPACT ON SYSTEM DEVELOPMENT M.S. Thesis
Gayle Jean Plato Jun. 1981 94 p refs
(AD-A104636) Avail: NTIS HC A05/MF A01 CSCL 05/1

Whether rational or irrational in nature, negative feelings toward computer based systems have been a persistent problem for computer implementors and systems managers for many years. People may sometimes fear for the future of their employment, feel intimidated by a technology they do not understand, resent the invasion of privacy associated with indiscriminate data collection, or exhibit a wide variety of other emotional responses. In order to better anticipate, understand and cope with the multitude of emotional reactions and interface problems that potentially may develop among non-technical computer system users, current literature pertaining to such negative attitudes has been explored. With a greater understanding of possible human-computer interface problems, it is believed that managers, computer professionals, system users and social institutions alike can all assume important roles in helping to promote more universally positive interactions and attitudes in the future. GRA

N82-11978# National Training and Development Service for State and Local Government, Washington, D.C.
APPLYING SCIENCE AND TECHNOLOGY TO IMPROVE LOCAL GOVERNMENT PRODUCTIVITY
K. Janka, Kenneth D. Rainey, Fred Knight, and Thomas Urban Dec. 1980 110 p refs Prepared in cooperation with International City Management Association
(Grant NSF ISP-77-19055)
(PB81-217986; NSF/RA-800488) Avail: NTIS HC A06/MF A01 CSCL 05A

Some insights are outlined for ways to improve productivity and decrease the cost of local government service by making more effective use of science and technology (S&T). Results of a survey of 205 cities indicated the high priority items to be: predict ramifications and weight consequences; work with other departments; train personnel; employee and labor relations; and human relations. Steps involved in the process include preparation, or understanding the problems of the organization; formulation, or clarifying the issues; designing solutions; making plans and taking action; and evaluating the changes resulting from the actions taken. Early involvement of workers in identifying problems and implementing solutions is stressed. GRA

N82-11979# General Accounting Office, Washington, D. C. Federal Personnel and Compensation Div.
CIVIL SERVANTS AND CONTRACT EMPLOYEES: WHO SHOULD DO WHAT FOR THE FEDERAL GOVERNMENT
19 Jun. 1981 50 p refs
(PB81-219966; FPCD-81-43) Avail: NTIS HC A03/MF A01 CSCL 05I

The various contract reform bills introduced in the 96th Congress are analyzed in relation to those areas identified as needing improvement. The status of executive branch implementation of management controls of reform agency contract practices is determined and changes in the size of the Federal indirect contract work force are compared with the direct work force. Prior reports involving contractors used to do work that should have been done by Government employees and the extent to

which Government employees perform commercial services are also addressed. DOE

N82-11980# National Science Foundation, Washington, D. C. Div. of Science Resource Studies.
UNIQUE CHARACTERISTICS OF FINANCING SCIENCE IN THE USSR
E. I. Valuev, L. S. Glyazer, V. L. Groshev, V. I. Kushlin, M. R. Kokonina, G. A. Lakhtin, V. G. Lebedev, Yu. K. Petrov, S. V. Pirogov, and S. M. Ryumin 12 Jun. 1981 69 p Transl. into ENGLISH of the mono. "Osobennosti Finansirovaniya Nauki v SSSR" Moscow, 1976 p 1-107 Sponsored in part by JPRS
(PB81-212243) Avail: NTIS HC A04/MF A01 CSCL 05A

The general principles of Soviet scientific policy, the mechanism of the planning and financing of science on various levels of administration, the ways and forms of the realization of the expenditures allocated for the maintenance and development of scientific organizations are examined. GRA

N82-11284*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DSN MODEL FOR USE IN STRATEGIC PLANNING
K. C. Kelly, C. Y. Lin, and M. McKenzie *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 25-31 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

N82-11310*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN OPTIMIZATION MODEL FOR ENERGY GENERATION AND DISTRIBUTION IN A DYNAMIC FACILITY
F. L. Lansing *In its* The Telecommun. and Data Acquisition Rept. 15 Oct. 1981 p 206-222 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 05A

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N82-11981* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY, SECTION 1, ABSTRACTS. SUPPLEMENT 19
Jul. 1981 53 p
(NASA-SP-7039(19)-Sec-1) Avail: NTIS HC A04/MF A01 CSCL 05B

Abstracts are cited for 130 patents and patent applications introduced into the NASA scientific and technical information system during the period of January 1981 through July 1981. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or application for patent. A.R.H.

N82-11982* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY, SECTION 2, INDEXES. SUPPLEMENT 19
Jul. 1981 684 p
(NASA-SP-7039(19)-Sec-2) Avail: NTIS HC A99/MF A01 CSCL 05B

Citations of approximately 4,000 patents and patent applications for the period May 1969 through July 1981 are indexed according to subject, invention, source, number, and accession number. A.R.H.

N82-11983# National Inst. for Transport and Road Research, Pretoria (South Africa).
WRITING EFFECTIVE REPORTS
B. M. Davies, J. M. Roche, H. Duffey, and J. M. Clifford Mar. 1980 100 p refs
(PB81-214645; RI/1/80) Avail: NTIS HC A05/MF A01 CSCL 05B

The Research Application and Information (RA & I) Group's course on report writing is designed to help NITRR's authors become better writers by giving them straight forward rules for better style, and by encouraging them to criticize and revise their own work. Topics dealt with include audiences, structuring, grammar and references. Also covered are certain NITRR and CSIR in-house rules which have been developed over the years. GRA

N82-11984# Sheffield Univ. (England). Postgraduate School of Librarianship and Information Science.
CONTENT REPRESENTATION FOR RETRIEVAL
A. Harding and M. F. Lynch Oct. 1980 17 p refs Sponsored in part by British Library
(PB81-170672; BLR/D-5607) Avail: NTIS HC A02/MF A01 CSCL 05B

Progress made in research into the use of reduced vocabularies for information retrieval, using the shortest discriminant string technique, is reported. Evaluative experiments using linear associative retrieval and cluster oriented retrieval are described. T.M.

N82-11985# PEDCo-Environmental, Inc., Cincinnati, Ohio.
FGDIS PRIMER: MAJOR EQUIPMENT/COMPONENT CLASSIFICATIONS, PROBLEM/SOLUTION ACCESS CODES, AND DEFINITIONS RELATED TO FGD SYSTEMS AS CONTAINED IN THE FLUE GAS DESULFURIZATION INFORMATION SYSTEM (FGDIS)
May 1981 135 p
(Contract EPA-68-02-3173)
(PB81-225948) Avail: NTIS HC A07/MF A01 CSCL 05B

The major equipment and component classification used in the Flue Gas Desulfurization Information system is presented. Such things as the problem and solution codes used in conjunction with the FGD system performance data, as well as definitions of common terminology used to describe FGD systems and power plants in geneal are included. Along with the classifications of the various complex equipment items and components that comprise FGD systems, brief functional descriptions and illustrations are provided. GRA

N82-11986# National Technical Information Service, Springfield, Va.
MICROFICHE AS A VEHICLE FOR TECHNICAL REPORTS Final Report
George W. Reinhart Feb. 1981 40 p refs
(Contract LEAA-79-NI-R-004)
(PB81-228009) Avail: NTIS HC A03/MF A01 CSCL 05B

The possibility of improving the cost effectiveness of an information dissemination program by making a larger part of the dissemination in microfiche instead of paper copy is examined. Most of the advantages of microfiche accrue to the producer, and most of the disadvantages to the user. There is likely to be considerable resistance to broadening the use of fiche for the intended audience of criminal justice professionals. Several alternatives are presented for lessening this problem, including emphasis on the role of libraries, promoting the availability of fiche-to-paper copiers, and using microfiche itself in innovative ways to facilitate information transfer, rather than as an attempt to duplicate the features of a paper publication in a reduced size. GRA

N82-11987# Stanford Univ., Calif. Dept. of Computer Science.
INTEGRATING MEDICAL KNOWLEDGE AND CLINICAL DATA BANKS: DISCOVERY AND REPRESENTATION OF CAUSAL RELATIONSHIPS FROM A LARGE TIME-ORIENTED CLINICAL DATABASE. THE RX PROJECT Final Executive Summary, 1 May 1980 - 30 Apr. 1981
Gio C. Wiederhold and Robert L. Blum 18 Jun. 1981 43 p
(Grants HS-3650; LM-03370; RR00785)
(PB81-227233; NCHSR-81-144) Avail: NTIS HC A03/MF A01 CSCL 05B

The objective of the RX Project is to develop methods for:

increasing the validity of medical knowledge derived from large time-oriented databases containing routine, non-randomized clinical data; providing knowledgeable assistance to a research investigator in studying medical hypotheses on large databases; and fully automating the process of hypothesis generation and exploratory analysis. The RX computer program consists of a knowledge base (KB), a discovery module, a study module, and a clinical database. Utilizing techniques from the field of artificial intelligence, the KB contains medical and statistical knowledge hierarchically organized, and is used to assist in the discovery and study of new hypotheses. Confirmed results from the database are automatically encoded into the KB. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-11988# Los Alamos Scientific Lab., N. Mex.
NATIONAL COAL-MARKET CONDITIONS FOR THE YEAR 2000: REGIONAL-ISSUE IDENTIFICATION AND ANALYSIS, HIGH SCENARIO
Frank Wolak Jul. 1981 18 p refs
(Contract W-7405-eng-36)
(DE81-026425; LA-8906-MS) Avail: NTIS HC A02/MF A01

Coal market data inputs necessary to operate the model used for the solid-waste impacts of coal-fired electricity production are described. The ROCKY3 model generated minemouth prices and quantities produced for each coal type from each coal supply region and the delivered price and quantity to each coal consumption region of each coal type from all of the coal supply regions. DOE

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-11989*# National Aeronautics and Space Administration, Washington, D. C.
AGREEMENT GOVERNING THE ACTIVITIES OF STATES ON THE MOON AND OTHER CELESTIAL BODIES
E. D. Gaggero and R. Puceiro Ripoll Sep. 1981 35 p refs Transl. into ENGLISH from McGill Univ. Ann. of Air and Space Law (Canada), v. 5, 1980 p 449-480 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Montevideo Univ., Uruguay
(Contract NASw-3541)
(NASA-TM-76730) Avail: NTIS HC A03/MF A01 CSCL 05D

The treaty on the Moon is not revolutionary but it embodies the legal rule for future activities of man on the Moon as opposed to the Space Treaty of 1967 which was too general. The new text is conservative but still allows some room for the developing States as in the law of the sea. The Moon is declared the 'Common Heritage of Mankind' but the regime of exploitation of its resources is still blurred with imprecise guidelines still needing to be developed. The two superpowers cannot as in the past, ignore the rest of the world in the conquest of space and the fact that the U.N. is the depositary for ratifications, and not the two superpowers as in previous treaties, is the first sign of wider participation in the creation of Space Law. Author

N82-11990# Air Force Academy, Colo. Dept. of Astronautics and Computer Science.
MILITARY SPACE DOCTRINE: THE GREAT FRONTIER Final Report
Paul Viotti, ed., Peter A. Swan, ed., and Charles D. Friedenstein, ed. 3 Apr. 1981 168 p Proceedings of the Conf. at the USAFA Mil. Space Doctrine Symp., 1-3 Apr. 1981
(AD-A104574) Avail: NTIS HC A08/MF A01 CSCL 15/3

The report presents the consensus of 246 leaders of the Air Force space program to questions posed to them in three areas: United States space operations doctrine, United States space organization doctrine, and International/USSR space operations and organization doctrine. Within each of these areas, discussion is divided between the past, the present (1975-1985) and the future (post 1985). Author (GRA)

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N82-11991*# Boeing Co., Houston, Tex.
AUTOMATED WATER MONITOR SYSTEM FIELD DEMONSTRATION TEST REPORT. VOLUME 1: EXECUTIVE SUMMARY
Richard L. Brooks, Eldon L. Jeffers, Jim Perreira, Jerry D. Poel, David Nibley, and Robert H. Nuss 30 Sep. 1981 48 p refs 2 Vol.
(Contract NAS2-9885)
(NASA-CR-166228) Avail: NTIS HC A03/MF A01 CSCL 13B

A system that performs water quality monitoring on-line and in real time much as it would be done in a spacecraft, was developed and demonstrated. The system has the capability to determine conformance to high effluent quality standards and to increase the potential for reclamation and reuse of water. J.M.S.

N82-11992*# Boeing Co., Houston, Tex.
AUTOMATED WATER MONITOR SYSTEM FIELD DEMONSTRATION TEST REPORT. VOLUME 2: TECHNICAL SUMMARY
Richard L. Brooks, Eldon L. Jeffers, Jim Perreira, Jerry D. Poel, David Nibley, and Robert H. Nuss 30 Sep. 1981 313 p refs 2 Vol.
(Contract NAS2-9885)
(NASA-CR-166229) Avail: NTIS HC A14/MF A01 CSCL 13B

The NASA Automatic Water Monitor System was installed in a water reclamation facility to evaluate the technical and cost feasibility of producing high quality reclaimed water. Data gathered during this field demonstration test are reported. J.M.S.

N82-11993*# Rasor Associates, Inc., Sunnyvale, Calif.
JET IMPINGEMENT HEAT TRANSFER ENHANCEMENT FOR THE GPU-3 STIRLING ENGINE
Douglas C. Johnson, Craig W. Congdon, Lester L. Begg, Edward J. Britt, and Lanny G. Thieme Oct. 1981 28 p refs
(NASA-TM-82727; DOE/NASA/51040/33) Avail: NTIS HC A03/MF A01 CSCL 13F

A computer model of the combustion-gas-side heat transfer was developed to predict the effects of a jet impingement system and the possible range of improvements available. Using low temperature (315 C (600 F)) pretest data in an updated model, a high temperature silicon carbide jet impingement heat transfer system was designed and fabricated. The system model predicted that at the theoretical maximum limit, jet impingement enhanced heat transfer can: (1) reduce the flame temperature by 275 C (500 F); (2) reduce the exhaust temperature by 110 C (200 F); and (3) increase the overall heat into the working fluid by 10%, all for an increase in required pumping power of less than 0.5% of the engine power output. Initial tests on the GPU-3 Stirling engine at NASA-Lewis demonstrated that the jet impingement system increased the engine output power and efficiency by 5% - 8% with no measurable increase in pumping power. The overall heat transfer coefficient was increased by 65% for the maximum power point of the tests. A.R.H.

N82-11994*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EVALUATION OF THE MICRO-CARBURETOR

Merkel F. Weiss, Robert A. Hall, and Steven D. Mazor Aug. 1981 83 p refs
(Contracts NAS7-100; DE-AI01-79CS-50080)
(NASA-CR-164958; JPL-Pub-81-75) Avail: NTIS HC A05/MF A01 CSCL 13F

A prototype sonic, variable-venturi automotive carburetor was evaluated for its effects on vehicle performance, fuel economy, and exhaust emissions. A 350 CID Chevrolet Impala vehicle was tested on a chassis dynamometer over the 1975 Federal Test Procedure, urban driving cycle. The Micro-carburetor was tested and compared with stock and modified-stock engine configurations. Subsequently, the test vehicle's performance characteristics were examined with the stock carburetor and again with the Micro-carburetor in a series of on-road driveability tests. The test engine was then removed from the vehicle and installed on an engine dynamometer. Engine tests were conducted to compare the fuel economy, thermal efficiency, and cylinder-to-cylinder mixture distribution of the Micro-carburetor to that of the stock configuration. Test results show increases in thermal efficiency and improvements in fuel economy at all test conditions. Improve fuel/air mixture preparation is implied from the information presented. Further improvements in fuel economy and exhaust emissions are possible through a detailed recalibration of the Micro-carburetor. Author

N82-11995# California Univ., Berkeley. Lawrence Berkeley Lab.
URBAN ECOSYSTEM AND RESOURCE-CONSERVING URBANISM IN THIRD WORLD CITIES
R. L. Meier, Sam Berman, Tim Campbell, and Chris Fitzgerald Mar. 1981 195 p refs
(Contract W-7405-eng-48)
(DE81-029854; LBL-12640) Avail: NTIS HC A09/MF A01

A comprehensive overview based on urban ecosystems was employed in field studies of representative cities in developing regions. The rising overall demand of cities in the developing regions was examined with emphasis on petroleum and caloric foodstuffs. Policies necessary to conserve energy and to adapt to increased costs and the possibility of food and water shortages are addressed. DOE

N82-11996# Argonne National Lab., Ill.
LITHIUM/IRON SULFIDE CELL DEVELOPMENT FOR ELECTRIC-VEHICLE PROPULSION
E. C. Gay, W. E. Miller, V. M. Kolba, and H. Shimotake 1980 15 p refs Presented at 29th Power Sources Conf., Atlantic City, N. J., 9-12 Jun. 1980
(DE81-023570; CONF-800612-5) Avail: NTIS HC A02/MF A01

The development of high-performance, secondary batteries for electric vehicle propulsion is described. The program on the electric-vehicle battery involves the development, design, and fabrication of a series of full-scale lithium/metal sulfide batteries, designated Mark IA, II, and III. A status report on the cell development for this program is given. These cells consist of a lithium-aluminum (Li-Al) negative electrode, an FeS positive electrode and molten LiCl-KCl electrolyte. The melting point of the electrolyte requires a cell operating temperature in the range of 400-500 C. Test results are presented and discussed. DOE

N82-11997# Aerospace Corp., Los Angeles, Calif.
ASSESSMENT OF FLYWHEEL SYSTEM BENEFITS IN SELECTED VEHICLE APPLICATIONS
L. H. Kubo and L. Forrest 1981 7 p refs Presented at IECEC Conf., 9 Aug. 1981
(Contract DE-AC08-79ET-26306)
(DE81-025976; CONF-810812-31) Avail: NTIS HC A02/MF A01

The performance of vehicle systems incorporating energy storage flywheels was investigated. The effort involved an indept assessment of flywheel system benefits in two vehicle applications: a four-passenger commuter car with electric drive (flywheel range extension application) and a six-passenger family car with conventional heat engine drive (flywheel fuel conservation application). The special case of the six-passenger vehicle as used in taxicab service was also investigated. A number of possible component design/selection alternatives for flywheel rotors, continuously variable transmissions, batteries, motors, and other propulsion elements were examined. Results of the assessment are provided for the case of a series-configuration heat engine/flywheel drive train as used in the passenger car and urban taxi vehicle missions. DOE

N82-11998# Food and Drug Administration, Rockville, Md. Office of Planning and Evaluation.
FORECAST OF EMERGING TECHNOLOGIES Final Report
Jun. 1981 119 p
(PB81-227290; FDA/ACPE-81/95) Avail: NTIS HC A06/MF A01 CSCL 06E

A compilation and analysis of information collected during a study of emerging technologies that may affect, or be affected by, FDA within the next 5-15 years are presented. A total of 168 distinct new technologies and/or substantially different aspects of single technologies were identified by scientific experts inside and outside of FDA. Study participants were also asked to estimate the approximate time of arrival and barriers (cost risk, technical problems) that may affect the technologies arrival. About 25 pecent of the technologiezs identified were related to the areas of genetic engineering or advances in computer technology. According to study participants, each of the ten most frequently mentioned new technologies may arrive within the next five years. T.M.

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-11999 Rensselaer Polytechnic Inst., Troy, N. Y.
OBSERVATIONS OF MOLECULAR CLOUDS CONTAINING REFLECTION NEBULAE Ph.D. Thesis
Dennis Edward Machnik 1981 210 p
Avail: Univ. Microfilms Order No. 8121154

The rotational transition of the linear molecule CO, and the less abundant species C13O, in about 130 molecular clouds associated with reflection nebulae are observed. Contour maps of the 2.6 mm wavelength emission are presented for a number of regions mapped in reflection nebulae where enhanced CO emission was observed. While the CO emission enhancement was noted to lie in the vicinity of the moderately early type star illuminating the reflection nebula, there is a tendency for the CO peak to be slightly displaced from the star. The observations of two species of this molecule allow a rough classification of the emission enhancements as enhancements of either density or temperature. Both types were observed. Tables are given of parameters for the illuminating stars, along with parameters describing the CO and C13O emission towards the star and emission peaks. A number of cloud parameters and star parameters are compared for the whole group of nebulae in the survey, in order to search for possible correlations between parameters. Part of the purpose of this program was the study of regions near young stars, and the interactions between the star and the young stars, and the interactions between the star and the surrounding medium. The possibility that the star was recently created out of the material observed in the region is discussed. Dissert. Abstr.

N82-12000 California Univ., San Diego.
X-RAY AND GAMMA-RAY OBSERVATIONS OF PULSED EMISSION FROM RADIO PULSARS Ph.D. Thesis
Frederick Keck Knight 1981 147 p
Avail: Univ. Microfilms Order No. 8120532

A search for pulsed emission from radio pulsars in the energy range 15 keV to 10 MeV was conducted using the hard X-ray

and low energy gamma-ray instrument on the HEAO-1 spacecraft. From a sample of twelve candidate radio pulsars, only the Crab pulsar was detected, and upper limits to the intensity of emission from the other candidates indicate that the majority (7 to 10) do not emit more than a few percent of their rotational energy loss in hard X-rays. Observations of the 18-200 keV pulsed emission from the Crab pulsar show that the systematic variation of spectral slope as a function of pulse phase, discovered at lower energies (4-60 keV), continues up to approximately 200 keV, strengthening the case for the existence of at least two pulsed emission components: the emission from the two main pulse peaks and a separate interpulse emission connecting the two peaks. Dissert. Abstr.

N82-12001 California Univ., Los Angeles.
M-ALPHA EMISSION FROM A DISK IN THE CLOSE BINARY U CEPHEI: A MONTE CARLO SIMULATION Ph.D. Thesis
Richard Clayton Crawford 1981 177 p
Avail: Univ. Microfilms Order No. 8120936

Twenty-four H alpha spectrograms of the eclipsing binary U Cephei were obtained during its 1974-1976 outburst. The line profiles on the ten of those obtained during total eclipse display prominent emission from matter in a ring or disk surrounding the hotter component. The emission is analyzed under the assumption of low optical depth, and this assumption is then verified by a Monte Carlo synthesis on the line profiles. The Monte Carlo simulation is useful for the calculation of line profiles from regions with optical depths less than unity. The velocity structure of the emitting region is composed of two components--rotation and 'turbulence'. The rotational velocity is inversely proportional to the radius, although it is approximately Keplerian circular near the star. The width of the emission profiles leads to disordered velocities (herein called 'turbulence') on the order of 100 km/sec, with no strong radial dependence. This turbulence includes deviations from axial symmetry in the rotational velocity as well as eddies and/or other motions. Dissert. Abstr.

N82-12002 Toledo Univ., Ohio.
PHOTOELECTRIC SURFACE BRIGHTNESS OBSERVATIONS AND THE GEOMETRY OF REFLECTION NEBULAE Ph.D. Thesis
Matthew James Cottrell 1981 179 p
Avail: Univ. Microfilms Order No. 8121650

Photoelectric surface brightness measurements of three reflection nebulae: IC 5076, NGC 1432, and the nebulosity are illuminated by 17 Tauri are reported. These observations are corrected for instrumentally scattered light and for variable sky background contamination. Similar observations of a fourth nebula Cederblad 201, are also discussed. Techniques for modelling the surface brightness distributions of nebulae are discussed, including two models for the nebula IC 5076. Using relatively well known grain properties at visible wavelengths, the geometry of each object and its ultraviolet brightness distributions are investigated. Dissert. Abstr.

N82-12003 Harvard Univ., Cambridge, Mass.
OPTICAL AND ULTRAVIOLET STUDIES OF STELLAR CHROMOSPHERES OF LAMBDA ANDROMEDAE AND OTHER LATE-TYPE STARS Ph.D. Thesis
Sallie Louise Baliunas 1980 236 p
Avail: Univ. Microfilms Order No. 8120243

Chromospheric studies of the outer atmospheres of several late type stars are preseted along with a comprehensive study of lambda Andromedae, an active chromosphere star. Investigations were made of the chromospheric features of Ca II H and K, Mg II h and k, and other, high temperature emissions accessible to the Copernicus and international ultraviolet satellites. Analogues to solar activity are consistent with the spectral behavior of the chromospheric indicators. The chromospheric activity and variability in Ca II H and K in lambda and are similar to sunspot and solar flare activity. In addition, a search was begun for short-timescale (few minutes) fluctuations in the H and K cores in several late-type stars. Calibrated spectrophotometry for the Ca II K profiles and additional constraints provided by H alpha and the ultraviolet observations of Mg II and the high temperature transition-region emissions were employed in the construction of semi-empirical chromospheric models of lambda And, alpha Aur, and alpha Boo. A prescription is given for models of active chromosphere stars, which may also be useful for other late type stars. Dissert. Abstr.

N82-12004*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
THEORETICAL STUDIES OF CHROMOSPHERES AND WINDS IN COOL STARS Semiannual Report, 1 Apr. - 30 Sep. 1981
A. K. Dupree Nov. 1981 8 p
(Grant NAGw-100)
(NASA-CR-164969; SAR-2) Avail: NTIS HC A02/MF A01 CSCL 03A

Calculated radiative losses from H, H-, Ca II, and Mg II show that cooling for the chromosphere of the supergiant epsilon Gem do not differ greatly from the solar law, although there are differences at approximately 6000K due to ionization effects. With a rough standard law for computation of stellar winds using the Hartmann-MacGregor theory and standard stellar evolutionary calculations, the wind velocities and temperatures in the HR diagram were systematically explored. Results show that cool winds with tempratures < 1,000,00K are not possible for log g > or = 2. Predicted wind velocities are approximately 1.5 to 2 x larger than observed, particularly for the most luminous cool stars. The ionization balance for the wind of alpha ORI and the hydrogen profile lines for T Tauri stars were computed using the PANDORA computer program. A.R.H.

N82-12005# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
NONRADIAL PULSATIONS OF UPSILON ORIONIS AND SUPERGIANTS
A. N. Cox 1981 4 p refs Presented at Workshop on Pulsating B Stars, Nice, 1-5 Jun. 1981 Submitted for publication
(Contract W-7405-eng-36)
(DE81-025338; LA-UR-81-1908; CONF-8106112-2) Avail: NTIS HC A02/MF A01

The overshooting nonradial mode driving for a pulsating star very close to the main sequence (upsilon Orionis) and for the nonradial pulsations of an A supergiant not too unlike alpha Cygnus types are discussed. A 15 solar mass 30,000 K model of less than on million years was constructed for upsilion Orionis, and a 25 m, 10,000 k model was constructed for the supergiants. Overshooting from a convective core or a convective shell was found to be a likely cause of pulsations in near sequence B stars and in supergiants. DOE

N82-12006# Los Alamos Scientific Lab., N. Mex.
LINEAR AND NONLINEAR THEORY STUDY OF ALPHA VIRGINIS
Arthur N. Cox, Stephen W. Hodson, and Sean P. Clancy 1981 11 p refs Presented at the Workshop on Pulsating B Stars, Nice, 1-5 Jun. 1981
(Contract W-7405-eng-36)
(DE81-025335; LA-UR-81-1907; CONF-8106112-1) Avail: NTIS HC A02/MF A01

Nonlinear radiation hydrodynamic calculations using a model for Alpha Virginis, a beta Cephei star, were made to see if the cause of the recurrent radial pulsation epochs can be discovered. The basic observed characteristics of beta Cephei variables are presented. Various proposals reviewed to make these stars pulsate concludes that the excitation mechanism must be in the central convective core or variable composition regions. The envelope damps radial fundamental mode pulsations in 4 years and in even shorter periods for radial overtones. It is proposed that the mixing of envelope hydrogen into the hydrogen depleted (or even exhausted) core can produce periodic pressure pulses which drive the pulsation amplitude up to the observed value. During the decay of the pulsations, evolution toward higher luminosities enables further episodes of mixing and driving to occur. It is predicted that rapid amplitude increases when mixing occurs and a slow decay of radial (and nonradial modes for other beta Cephei variables) between mixing episodes. DOE

N82-11280*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIO ASTRONOMY
R. D. Shaffer, J. T. McCluskey, S. Gulkis, M. Klein, and T. Kuiper *In its* The Telecommun. and Data Acquisition Rept. 15 Oct.

1981 p 1-3 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

N82-11281*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A DEDICATED 26-m SETI SKY SURVEY INSTRUMENT FACILITY: A FEASIBILITY STUDY
A. L. Berman and R. D. Shaffer *In its* The Telecommun. and Data Acquisiton Rept. 15 Oct. 1981 p 4-8 refs (For primary document see N82-11279 02-31)
Avail: NTIS HC A11/MF A01 CSCL 03A

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-12007 Iowa State Univ. of Science and Technology, Ames.
THEORETICAL AND OBSERVATIONAL ASPECTS OF STELLAR VARIABILITY Ph.D. Thesis
Daniel William Peterson 1981 143 p
Avail: Univ. Microfilms Order No. 8122554

Hot spots on accreting white dwarfs with magnetic fields are investigated. It is found that various loss mechanisms do not destroy the accretion spots and that pulsed ultraviolet radiation will be emitted as the dwarf rotates. This pulsed radiation should be observable from dwarf companions near giant stars undergoing mass loss by a stellar wind and from slowly moving dwarfs accreting from the interstellar medium. A search for variability in three Hyades white dwarfs, GB-7, G7-41, and G7-255 is described. Data analysis by the maximum entropy method shows all three stars to be nonvariable. The use of the O-C diagram as a diagnostic tool in doubly periodic stars is investigated. A test is developed to distinguish between short and long secondary periods by using the amplitude of the O-C diagram. Application of this test to the RRs variable VZ Cnc establishes that this star is a multiple mode variable, and these results are confirmed by phase dispersion minimization analysis. Dissert. Abstr.

N82-12008 Cornell Univ., Ithaca, N. Y.
A SELF-CONSISTENT LINEAR-MODE ANALYSIS OF A STELLAR CONVECTION ZONE Ph.D. Thesis
Joel Mirick MacAuslan 1981 131 p
Avail: Univ. Microfilms Order No. 8119542

It is shown that a normal-mode expansion of the linearized fluid equations in terms of a subset of spherical harmonics can provide the basis for a self-consistent description of a solar-like convection zone. The linear modes growing from a static background, are assumed inviscid and adiabatic for self-consistency, they, together with radiation, carry exactly the constant flux required by the model. When the resulting equations are simplified according to physically motivated prescriptions, with the amplitude of the modes set by a shear criterion related to the Kelvin-Helmholtz instability, the equations contain a single free parameter, related to the persistence of linearity. Numerical solution of the equations for a simplified solar envelope and a simple spectrum of modes produces a variety of models of different persistences; it also leads to identification of the amplitude parameter with the efficiency of convection. The models show wide variation in power at various horizontal wavenumbers, in both peak luminosity and surface velocity spectra. Dissert. Abstr.

N82-12009 Washington Univ., Seattle.
THE BOGOLIUBOV TRANSFORMATION AND ITS APPLICATION TO COSMOLOGICAL PARTICLE PRODUCTION Ph.D. Thesis
Terry Lee Dannehold 1981 86 p
Avail: Univ. Microfilms Order No. 8122730

The Bogoliubov transformation, which is a linear combination of creation and annihilation operators, is discussed. The invariance of the commutation relations is examined. The Bogoliubov transformation is applied to the problem of particle production in curved space. In particular, it is shown tha conseration laws constrain particles produced by gravitational fields to be created in pairs, with a thermal spectrum, when the initial state is the vacuum. Initial states containing n particles are also treated. The creation and detection of particls is then examined in terms of information theory. The nonexistance of a time-like Killing vector in Robertson-Walker universe implies a 'noise' term in the equations governing conservation of energy and this term is responsible for particle creation. An equation for the particle production rate is deduced. It is then shown that cosmological particle production theories may be tested by calculating the gamma ray spectrum due to the decay of short-lived particles which are produced. Dissert. Abstr.

N82-12010*# District of Columbia Univ., Washington, D. C. Dept. of Computer Information System Sciences.
COMPUTATION OF AVERAGED MONTHLY ZONAL ALBEDO UTILIZING THE SOLAR ZENITH ANGLE, PROPERTIES OF CLEAR AND CLOUDY ATMOSPHERES
Harbans Dhuria Aug. 1981 93 p refs
(Grant NAG5-75)
(NASA-CR-164930) Avail: NTIS HC A05/MF A01 CSCL 03B

The zonal temporal averages of albedos at the top of the atmosphere were considered as a function of the length of the day. The length of the day were used to determine the average daily values of mu sub 0(=Cos of the solar zenith angle, theta sub 0). Polynominal fits of the slope and intercept functions of A sub s (cloud-free albedo) and A sub c(cloud albedo) as function of Cos theta sub 0 were obtained by using the sample values of albedo corresponding to solar zenith angles from 0 to 90 deg with interval of 5 deg. The daily zonal values of mu sub 0 and the surface albedos were used to compute the daily zonal values of albedos at the top of the clear and cloudy atmosphere. The monthly zonal cloud fractions were used to compute planetary albedo A at the top of the atmosphere. The global values of monthly albedos A sub s, A sub c and A were computed by using the weighting function defined as the difference of the sins of zonal values of latitudes. The computer program implementation is also described. B.W.

N82-12011# Oxford Univ. (England). Nuclear Physics Lab.
A MODEL OF THE NORMAL AND NULL STATES OF PULSARS
P. B. Jones 1981 25 p refs
(PB81-215907; Rept-24/81) Avail: NTIS HC A02/MF A01 CSCL 03B

A solvable three dimensional polar cap model of pair creation and charged particle acceleration is derived. There are no free parameters of significance apart from the polar surface magnetic flux density. The parameter CO determining the acceleration potential difference was obtained by calculation of elementary nuclear and electromagnetic processes. Solutions of the model exist for both normal and null states of a pulsar, and the instability in the normal state leading to the normal to null transition is identified. The predicted necessary condition for the transition is entirely consistent with observation. Author

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-12012 Cornell Univ., Ithaca, N. Y.
A THEORETICAL AND EXPERIMENTAL INVESTIGATION OF THE PHOTOMETRIC FUNCTIONS OF PARTICULATE SURFACES Ph.D. Thesis
Jay David Goguen 1981 234 p
Avail: Univ. Microfilms Order No. 8119442

Photometric functions of particlate materials are measured and modelled to infer physical characteristics and planetary surfaces from photometry. Model photometric functions are based on the solution of the radiative transfer equation (RTE) for a specified single particle phase function phi and the modification of the RTE solution for interparticle shadowing S adopted from

Irvine (1966). A survey of phase functions due to Fresnel reflection from large, opaque, smooth spheres with optical constants in the range of most common rocks and minerals reveals a systematic trend in the Bond albedo A sub B and asymmetry parameter g with composition: low indices of refraction correspond to low albedos and strong forward scattering; high indices of refraction correspond to high albedos and nearly isotropic scattering. Adding roughness on a scale compared to a wavelength reduces A sub B up to 25%; the albedos of darker particles are parameter shown an approximately linear decrease of 0.12 from 0 to 45 deg. rms slope independent of composition. Dissert. Abstr.

N82-12013 Cornell Univ., Ithaca, N. Y.
THE MORPHOLOGY AND EVOLUTION OF GANYMEDE AND CALLISTO Ph.D. Thesis
Steven Weldon Squyres 1981 353 p
Avail: Univ. Microfilms Order No. 8119466

High quality images of Ganymede and Callisto, obtained by the two Voyager spacecraft are used to investigate the surface characteritics, geologic processes, and internal evolution of Ganymede and Callisto. Ganymede shows two principal types of terrain. One is dark, old, and heavily cratered ('cratered terrain'); the other is brighter, younger, and characterized by complex patterns of grooves ('grooved terrain'). The surface of Callisto is uniformly dark, heavily cratered, nearly free of bright ray craters, and shows no evidence of tectonic activity. Voyager images are used to determine photometric properties of surface features on both bodies at phase angles up to 120. Surface temperatures are calculated for the major terrain types. Callisto is found to be somewhat warmer than Ganymede. The temperature difference between grooved and cratered terrain on Ganymede is small. Dissert. Abstr.

N82-12014 California Univ., Los Angeles.
THE OPPOSITION EFFECT OF PARTICULATE MINERAL SURFACES AND CONDENSATES: APPLICATIONS TO SATURN'S RINGS Ph.D. Thesis
Larry Kenneth Pleskot 1981 210 p
Avail: Univ. Microfilms Order No. 8121032

It is established that opposition brightening is common in bright materials. Thus, bright and dark surfaces commonly exhibit the phenomenon, but the nature of retroreflection in bright and dark laboratory samples is found to be significantly different. Some of the differences between retroreflective properties of bright and dark samples are consistent with albedo dependences of individual mechanisms; other differences suggest that prevalent mechanisms in bright and dark samples are distinct. Condensates possess retroreflection parameters similar to the rings'. Yet, opposition brightening in typical laboratory condensates is only about a third as strong as in the rings. Two conclusions result. First, intraparticle retroreflection probably occurs in the rings, and ring observations should not be directly used in multilayer ring models. Second, interparticle retroreflection in the rings also appears necessary to reconcile ring data with typical laboratory observations. However, variations of independed parameters such as surface roughness or mixing can produce enahanced retroreflection in laboratory condensates. Thus, the observed opposition effect of the rings may be entirely attributable to an intraparticle mechanism. Observational support for the classical ring model is thereby weakened. Dissert. Abstr.

N82-12015*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RADIATIVE TRANSFER IN COMETARY DUST ATMOSPHERES: CRITIQUE OF RECENT DEVELOPMENTS
Oldwig vonRoos 1 Oct. 1981 20 p refs
(Contract NAS7-100)
(NASA-CR-164946; JPL-Pub-81-80) Avail: NTIS HC A02/MF A01 CSCL 03B

The gas and dust production rates of comets near the sun are intimately linked to the fate of the solar radiation as it is scattered and partially absorbed by the cometary dust envelope or halo surrounding the comet's nucleus. The radiation of nuclear matter (mostly water ice) and the release of dust particles embedded in the ice which are entrained by the escaping gas and subsequently form a dust atmosphere or halo. On the other hand, the interaction of the dust cloud with the solar radiation is in turn responsible for the amount of radiative energy received by the nucleus and thus determines the evaporation rate. It is shown that recent attempts to formulate this problem quantitatively are in error. The correct formulation is given and it is pointed out that negative extinction (enhancement of the primary radiation received by the nucleus due to multiple scattering) may not be as large as predicted. J.D.H.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-12016*# National Aeronautics and Space Administration, Washington, D. C.
RADIATION BALANCES AND THE SOLAR CONSTANT
D. Crommelynck Jul. 1981 21 p refs Transl. into ENGLISH from Proceedings of the ESA Tech. Conf. (France), 1979 p 137-143 Conf. held in Lannion, France, 17-21 Sep. 1979 Translation was announced as N80-21812 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3198)
(NASA-TM-76612; ESA-SP-143) Avail: NTIS HC A02/MF A01 CSCL 03B

The radiometric concepts are defined in order to consider various types of radiation balances and relate them to the diabetic form of the energy balance. Variability in space and time of the components of the radiation field are presented. A specific concept for sweeping which is tailored to the requirements is proposed. Finally, after establishing the truncated character of the present knowledge of the radiation balance. The results of the last observations of the solar constant are given. Ground and satellite measurement techniques are discussed. S.L.

N82-12017# National Center for Atmospheric Research, Boulder, Colo. High Altitude Observatory.
SEARCH FOR OPTIMAL THREE-DIMENSIONAL MAPPING OF THE SOLAR CORONA FROM K-CORONAMETER DATA
R. Michael Perry and Martin D. Altschuler Apr. 1981 102 p refs
(Grant NSF ATM-77-23757)
(PB81-222903; NCAR/TN-170) Avail: NTIS HC A06/MF A01 CSCL 03B

An iterative technique was devised in which an approximation of the unknown solar electron density distribution is successively modified to reduce discrepancies with the original data. With the technique the corona can be mapped to a much finer resolution than shown in their previous papers without greatly increasing the computational cost. The series representation of density may now contain more than 23,000 terms compared with the previous limit of 128. This results in a fourfold increase in linear resolution, so that features about a tenth of a solar radius in width are now separate. The iteration algorithm can be adjusted to apply a mathematically optimal correction to a given approximation of the density. Although this correction minimizes noise levels, a cheaper version of the algorithm yields a better result. GRA

N82-12018# National Center for Atmospheric Research, Boulder, Colo.
COMPRESSIBLE CONVECTION IN A ROTATING SPHERICAL SHELL
Gary A. Glatzmaier 1980 200 p refs
(Grant NSF ATM-77-23757)
(PB81-222895; NCAR-CT-60) Avail: NTIS HC A09/MF A01 CSCL 03B

A hydrodynamical model of giant cell convection is used to gain further understanding of how differential rotation is maintained on the Sun. Anelastic fluid equations are derived for a compressible, rotating, spherical fluid shell. Then first order numerical solutions of these equations are found which describe the stability and structure of the giant cell convection in many different regions of parameter space. First order analytic solutions provide simple, physical explanations for the longitudinal phase propagation manifested in the numerical solutions. Second order numerical solutions are then calculated which describe the mean

differential rotation and meridional ciculation induced by the first order solutions. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-12019*# California Univ., Berkeley. Space Sciences Lab.

THE ISOTOPIC COMPOSITION OF THE ELEMENTS CARBON, OXYGEN, NEON, MAGNESIUM AND SILICON IN THE GALACTIC COSMIC RAYS

M. E. Wiedenbeck and D. E. Greiner (California Univ., Berkeley. Lawrence Berkeley Lab.) Mar. 1981 5 p refs Presented at 17th Intern. Cosmic Ray Conf., Paris, 13-25 Jul. 1981

(Contract NAS5-20995)

(NASA-CR-166715) Avail: NTIS HC A02/MF A01 CSCL 03B

High resolution observations of the isotopic composition of C, O, Ne, Mg, and Si in the galactic cosmic rays (GCR) are used to derive the isotopic compositions of these elements in the GCR source. It is found that the source is enhanced in the neutron-rich isotopes of Ne, Mg, and Si (relative to solar system composition). The significance and possible interpretations of these enhancements are discussed. J.D.H.

N82-12020*# California Univ., Berkeley.

A REVIEW AND INTERPRETATION OF RECENT COSMIC RAY BERYLLIUM ISOTOPE MEASUREMENTS

Andrew Buffington 26 Apr. 1978 28 p refs Presented at a Symp., Washington, D.C., 26 Apr. 1978; sponsored by the Am. Phys. Soc. Submitted for publication

(Grant NGR-05-003-553; Contract W-7405-eng-48)

(NASA-CR-164967) Avail: NTIS HC A03/MF A01 CSCL 03B

Beryllium-10 is of interest for cosmic ray propagation, because its radioactive decay half-life is well matched to the expected cosmic ray age. Recent beryllium isotope measurements from satellites and balloon covered an energy range from about 30 to 300 MeV/nucleon. At the lowest energies, most of the Be-10 is absent, indicating a cosmic ray lifetime of order 2 x 10 to the 7th power years and the rather low average density of 0.2 atoms/cc traversed by the cosmic rays. At higher energies, a greater propagation of Be-10 is observed, indicating a somewhat shorter lifetime. These experiments will be reviewed and then compared with a new experiment covering from 100 to 1000 MeV/nucleon. Although improved experiments will be necessary to realize the full potential of cosmic ray beryllium isotope measurements, these first results are already disclosing interesting and unexpected facts about cosmic ray acceleration and propagation. Author

99 GENERAL

N82-12021# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA MECHANIA SINICA

15 Sep. 1981 96 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 Original language document was announced as AD-A105635 Transl. by SCITRAN, Santa Barbara, Calif.

(AD-A105635; FTD-ID(RS)T-0705-81) Avail: NTIS HC A05/MF A01 CSCL 20/4

Numerical analyses of flow calculations are presented, phase shift interferometry applied to low density flows, and a design technique for internal burning star grains of solid propellants described. For individual titles, see N82-12022 through N82-12026.

N82-12022# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

DIFFERENCE METHOD IN FLUID DYNAMICS. 1. NUMERICAL SOLUTION OF TWO DIMENSIONAL VORTICITY EQUATION **c34**

Guo Benyu *In its* Acta Mech. Sinica (Selected Articles) FTD-ID(RS)T-0705-81 15 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)

Avail: NTIS HC A05/MF A01 CSCL 20/4

With the two dimensional vorticity equation as an example, the theoretical problem of difference equations in fluid dynamics is discussed. Schemes based on the conservation laws and transport properties are constructed. Generalized stability is introduced. The error of periodic solutions is rigorously estimated. The effect of error in boundary values on the stability of computation and the boundary shape, boundary conditions and its treatment in the initial/boundary problems are analyzed. The computational problem of nonviscous flow and large gradient solution is treated according to the conservation laws. The convergence of dynamic relaxation and the existence of solutions of steady flow computational schemes are studied. Examples are used to illustrate the applications of these results in fluid dynamic computations and numerical weather forecast. J.D.H.

N82-12023# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ON THE KERNEL FUNCTION COLLOCATION METHOD IN STEADY SUBSONIC FLOW FOR WING WITH CONTROL SURFACES **c02**

Chen Jing Song *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)

Avail: NTIS HC A05/MF A01 CSCL 20/4

The forms of the lift distribution function for wings with control surfaces in steady subsonic flow are analyzed. Methods for treating kernel singularities of linear integral equations and singularities of the lift distribution function are discussed and the numerical solution to the integral equation is given. These methods may be used to calculate the lift distribution of the wing by itself or of the wing with partial or full control surfaces on both the leading and trailing edges. The numerical values agree well with experimental data and have the same accuracy as those given by other theories. As compared with the vortex lattice method, the computational storage requirement for this method is smaller and the computational time is less. The numerical computation may be carried out on smaller computers.

N82-12024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ON THE CAPACITY OF HOLOGRAPHIC PHASE-SHIFT INTERFEROMETRIC TECHNIQUE IN THE VISUALIZATION OF LOW DENSITY FLOWS **c34**

Hau Yu Li, Chao Yi Xu, Jizu Shu, and Jin Min Hu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 51-63 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)

Avail: NTIS HC A05/MF A01 CSCL 20/4

A detailed analysis of the phase shift interferometric technique is presented. It is determined that when the phase shift value is pi/2, a resolution limit about lambda/1000 can be achieved. This is 25.4 times higher than the common double exposure holographic method provides. When the phase shift value increases from pi/2 to pi, the sensitivity also increases monotonously. The experimental application of phase shift interferometry to low density flows is described, and some problems in applications of the technique discussed. J.D.H.

N82-12025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANALYTICAL DESIGN FOR INTERNAL BURNING STAR GRAINS OF SOLID ROCKETS **c28**

Changtang Lu *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 64-74 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979

(For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

The various geometric parameters of the internal burning star grain, the characteristic parameters of solid propellant, and the technical specifications of the rocket motor are combined, the set of design equations established according to the best principle of grain design, and the set of equations solved quickly by incorporating simple equations and curves. This method not only involves less computational work than geometric methods and guarantees the required technical specifications but also yields a design that approaches the optimal, improves the characteristics of the rocket motor, saves materials, and requires less computer time. J.D.H.

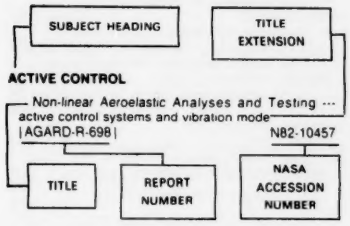
N82-12026# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

NUMERICAL COMPUTATION AND ANALYSIS OF THE FLOW FIELD IN A LARGE SHOCK TUBE WITH A VARIABLE CROSS-SECTIONAL AREA **c34**

Wen Xuan Li and Jiajun Wang *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 75-83 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979 (For primary document see N82-12021 02-99)
Avail: NTIS HC A05/MF A01 CSCL 20/4

Certain flow characteristics of the new shock wave that exists in shock tubes with violently varying cross section are analyzed. The state equation of the explosive gas produced by the combustion of the explosive in the high pressure section and the contact discontinuity between the explosive gas and air are taken into consideration. In order to treat many strong discontinuities, the difference method with artificial viscosity term q is adopted. The Lagrangian coordinates are used so that the contact discontinuities can be easily treated. The head of the major shock wave has little vibration, occupying only 2-3 grid spacings. J.D.H.

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7050).

A

A-7 AIRCRAFT
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054

System safety program plan --- electromagnetic pulse testing of the A-7E aircraft
[AD-A104557] N82-11354

ABLATIVE MATERIALS
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen
N82-11026

ABSORBENTS
Cycle and performance analysis of absorption heat pumps for waste heat utilization
[DE81-030705] N82-11405

Geothermal environmental assessment: Behavior of selected geothermal brine contaminants in plants and soils
[PB81-222333] N82-11671

ABSORBERS (MATERIALS)
Use of a vegetative filter zone to control fine-grained sediments from surface mines
[PB81-226110] N82-11674

ABSORPTION SPECTROSCOPY
Submicron-particle absorption spectroscopy by photothermal modulation of MIE scattered light
[DE81-025096] N82-11160

Guide to the evaluation and use of an atomic absorption spectrophotometer
[PB81-222853] N82-11444

ABSORPTIVITY
A model describing the microwave emission from a multi-layer snowpack at 37 GHz
[NASA-CR-166708] N82-11510

Acoustic scaling: A review of progress to date, and of possible future development
[BBC-RD-1981/6] N82-11855

ABSTRACTS
NASA Patent Abstracts bibliography: A continuing bibliography, section 1, abstracts. Supplement 19
[NASA-SP-7039(19)-SEC-1] N82-11981

ACCESS CONTROL
Multiaccess of a slotted channel by finitely many users
[AD-A104417] N82-11349

User's guide: Voice and data communications protection
[PB81-221509] N82-11356

Some notes on operating-system principles
[DE81-030675] N82-11818

ACCIDENT PREVENTION
Preventing large-battery explosions
[PB81-227373] N82-11628

ACID RAIN
Effects of acid precipitation on cation transport in New Hampshire forest soils
[DE81-027494] N82-11648

ACIDITY
Use of polyethers in the treatment of acidic high-activity nuclear wastes
[DE81-027087] N82-11895

ACOUSTIC ATTENUATION
Contribution to the characterization of the anelastic properties of multi-phase systems
[DE81-025581] N82-11198

An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857

ACOUSTIC EMISSION
Detection of acoustic emission in composites by optical fiber interferometry N82-11125

Attenuation of ultrasonic interface waves on metal-polymer-metal boundaries N82-11127

Optical detection of pulsed surface particle displacements N82-11131

Wideband optical measurements of ultrasonic pulses N82-11132

ACOUSTIC IMPEDANCE
A new method for measuring the acoustic impedance of the ground N82-11856

ACOUSTIC LEVITATION
System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861

ACOUSTIC MEASUREMENTS
Acoustic waveguide technique for sensing incipient faults in underground power-transmission cables: Including acousto-optic techniques
[DE81-029626] N82-11381

A new method for measuring the acoustic impedance of the ground N82-11856

Handbook for industrial noise control
[NASA-SP-5108] N82-11858

ACOUSTIC PROPAGATION
An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857

SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860

ACOUSTICS
Acoustic scaling: A review of progress to date, and of possible future development
[BBC-RD-1981/6] N82-11855

ACOUSTO-OPTICS
Thermal expansion of metal matrix composites --- acousto-optic study of microcracks and temperature measurement
[AD-A104680] N82-11134

Optoacoustic spectroscopy to detect hydrazine fuels
[AD-A104675] N82-11229

Acoustic waveguide technique for sensing incipient faults in underground power-transmission cables: Including acousto-optic techniques
[DE81-029626] N82-11381

ACTINIDE SERIES COMPOUNDS
Surface analysis by Fourier transform infrared (Ftir) spectroscopy
[DE81-025741] N82-11150

ACTINIUM
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170

ACTIVATED CARBON
Adsorption of mixed liquids and solids from water solution onto activated carbon N82-11141

Sewage sludge additive
[NASA-CASE-NPO-13877-1] N82-11634

ACTIVATION
Activation of superalloys and stainless steels for chromium plating
[AD-A104313] N82-11188

ACTIVATION ENERGY
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE81-025587] N82-11577

Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron
[DE81-025540] N82-11973

ACTUATORS
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072

ADAPTIVE CONTROL
Practical design and realization of a digital adaptive flight control system N82-11079

Architecture tuning of a real-time signal sorter in a dense environment
[AD-A104524] N82-11787

ADAPTIVE FILTERS
Recovery of seismic signals in noise by adaptive processing
[DE81-029469] N82-11713

Constrained adaptive least mean squared filters
[AD-A104625] N82-11830

ADDITIVES
The stability of new transparent polymeric materials: The epoxy trimethoxyboroxine system. Part 1: The preparation, characterization and curing of epoxy resins and their copolymers
[NASA-CR-164951] N82-11208

Mechanism of Monuron-accelerated dicyandiamide cure of epoxy resins
[AD-A104658] N82-11213

Sewage sludge additive
[NASA-CASE-NPO-13877-1] N82-11634

ADDRESSING
Automatic multi-banking of memory for microprocessors
[NASA-CASE-NPO-15295-1] N82-11785

ADHESION
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183

Dynamic Moire methods for detection of loosened space shuttle tiles
[NASA-TM-83205] N82-11434

ADHESIVE BONDING
Attenuation of ultrasonic interface waves on metal-polymer-metal boundaries N82-11127
Waves guided by a thin viscoelastic layer between elastic solids N82-11129
ADHESIVES
Thermal control coatings based on trialkoxysilane hydrolysate binders — tolerance to ultraviolet radiation in vacuum
[NASA-CASE-MFS-25620-1] N82-11118
Aluminum ion-containing polyimide adhesives
[NASA-CASE-LAR-12640-1] N82-11206
Chemorheology and quality control for an adhesive
[AD-A104556] N82-11215
ADJOINTS
Sensitivity theory for nonlinear systems. 2: Extensions to additional classes of responses
[DE81-030258] N82-11845
ADRENAL METABOLISM
Participation of the hypophyseal-adrenal cortex system in thrombin clearance during immobilization stress
[NASA-TM-76729] N82-11760
ADRENOCORTICOTROPIN (ACTH)
Participation of the hypophyseal-adrenal cortex system in thrombin clearance during immobilization stress
[NASA-TM-76729] N82-11760
ADSORPTION
Adsorption of mixed liquids and solids from water solution onto activated carbon N82-11141
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967
AERATION
Ocean thermal energy conversion gas-desorption studies. Volume 2: Deaeration in a packed column and a barometric intake system
[DE81-030469] N82-11619
Stabilization characteristics of deposits of biologic solids generated in aerated lagoons
[PB81-224297] N82-11668
AERIAL PHOTOGRAPHY
A method for using aerial photos in delineating historic patterns of beach accretion and retreat
[PB81-223836] N82-11536
AEROACOUSTICS
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
AERODYNAMIC CHARACTERISTICS
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
AERODYNAMIC COEFFICIENTS
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
AERODYNAMIC CONFIGURATIONS
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
AERODYNAMIC FORCES
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070
AERODYNAMIC HEATING
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen N82-11026
Non-solar power tests at the Central Receiver Test Facility (CRTF)
[DE81-026955] N82-11604
AERODYNAMIC NOISE
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039
AERONOMY
National Center for Atmospheric Research
[NCAR/AR-80] N82-11692
Geomagnetic observations N82-11693
Report on research at AFGL
[AD-A104513] N82-11704
AEROSOLS
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637
Chebyshev polynomial approximation in the OPAQUE program
[AD-A104317] N82-11638
Low-Btu-gasifier emissions toxicology
[DE81-031000] N82-11651
Improved simulation of aerosol, cloud, and density measurements by shuttle lidar
[NASA-CR-3473] N82-11688
The deconvolution of aerosol backscattered optical pulses to obtain system-independent aerosol signatures
[AD-A104578] N82-11914
AEROSPACE ENGINEERING
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
An overview of optimal control in aerospace systems N82-11074
AEROSPACE SYSTEMS
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
An overview of optimal control in aerospace systems N82-11074
AGING (MATERIALS)
Survey on aging on electrodes and electrocatalysts in phosphoric acid fuel cells
[NASA-CR-165505] N82-11545
AGING (METALLURGY)
Effects of alloying on aging and hardening processes of steel with 20% nickel
[NASA-TM-76624] N82-11186
Irradiation-induced swelling in commercial alloys
[DE81-029755] N82-11191
AGRICULTURE
Irrigation market for solar thermal parabolic dish systems
[NASA-CR-164955] N82-11549
AIR
High-voltage air-core pulse transformers
[DE81-030999] N82-11370
On electron beam ionization of air and chemical reactions for disturbed air deionization
[AD-A104517] N82-11871
AIR CONDITIONING
Energy analysis for a sample building by the proposed ASHRAE simplified method
[DE81-027189] N82-11323
AIR CONDITIONING EQUIPMENT
Light-commercial Brayton/Rankine space-conditioning system
[DE81-024137] N82-11586
AIR CONDUCTIVITY
Test results and analysis of a convective loop solar air collector
[DE81-028151] N82-11599
AIR FLOW
Analytical and experimental study of flow phenomena in noncavitating rocket pump inducers
[NASA-CR-3471] N82-11031
AIR INTAKES
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle — conducted in the Lewis 10 by 10 foot wind tunnel
[NASA-TM-82728] N82-11042
AIR NAVIGATION
The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739
AIR POLLUTION
Coal gasifier parameters influencing environmental pollutant production
[PB81-221301] N82-11273
An evaluation of three-way control single and dual bed catalysts as applied to heavy-duty gasoline engines
[PB81-224982] N82-11477
EPA evaluation of the Automotive Cylinder Deactivator System (ACDS) under Section 511 of the Motor Vehicle Information and Cost Saving Act
[PB81-228256] N82-11480
Mathematical modeling of photochemical air pollution N82-11629
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637
Proof of concept study
[AD-A104338] N82-11639
Trace-element and phase relations in fly ash
[DE81-028555] N82-11643
Report of Lawrence Livermore National Laboratory to the Federal Aviation Agency on the high-altitude pollution program, 1980
[DE81-026264] N82-11647
Sulfur pollution control. Phase 2: The impact of stack gas cleanup on the sulfur mining industry of Texas and Louisiana
[PB81-222820] N82-11653
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654
Industrial process fugitive emissions inventory for the Region V Great Lakes shoreline
[PB81-212037] N82-11658
Airborne radiological sampling of Mount St. Helens plumes
[PB81-213795] N82-11659
Control techniques for sulfur oxide emissions from stationary sources, second edition
[PB81-220048] N82-11662
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 6: Innovation by regulation: The administration of control technology requirements under the Clean Air Act
[PB81-221616] N82-11664
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 7: Periodic review and technological escalation of performance standards: New source performance standards review process
[PB81-218117] N82-11665
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 8: Controlled trading and site-specific SIP revisions: Competing for attention in a crowded administrative route
[PB81-218273] N82-11666
New Hampshire and Vermont point source inventory update for NECRMP
[PB81-219339] N82-11672
Evaluation of exhaust emissions data for diesel engines used in underround mines
[PB81-225377] N82-11673
Calculations from compliance emissions of long and short term SO2 concentrations in the southwest Pennsylvania air quality control region
[PB81-226078] N82-11678
Selected studies of four high-temperature air-pollution sources N82-11680
Stratospheric trace gas composition studies utilizing in situ cryogenic, whole-air sampling methods
[AD-A104375] N82-11689
Workbook for estimating the climatology of regional continental scale atmospheric dispersion and deposition over the United States
[PB81-224172] N82-11748
AIR QUALITY
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635
Calculations from compliance emissions of long and short term SO2 concentrations in the southwest Pennsylvania air quality control region
[PB81-226078] N82-11678
AIR TRAFFIC CONTROL
FAA misses opportunities to discontinue or reduce operating hours of some airport traffic control towers
[PB81-224214] N82-11049
AIR WATER INTERACTIONS
Climate Diagnostics Workshop (5th) annual proceedings
[PB81-222200] N82-11735

Numerical studies of hurricane-ocean interactions
[PB81-225575] N82-11741

AIRCRAFT ANTENNAS
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339

AIRCRAFT CONTROL
Control law design for transport aircraft flight tasks N82-11080

AIRCRAFT DESIGN
Acta mechanica sinica
[AD-A105184] N82-11014
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
Design techniques for mutivariable flight control systems N82-11078

AIRCRAFT ENGINES
A new method of cooling turbine vanes N82-11027
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068
Development of multivariable controllers for aircraft turbine engines N82-11087
JT8D high pressure compressor performance improvement
[NASA-CR-165531] N82-11467
Integrated analysis of engine
[NASA-TM-82713] N82-11491

AIRCRAFT EQUIPMENT
Threat Alert and Collision Avoidance System (TCAS) Symposium
[AD-A104563] N82-11047
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104498] N82-11212

AIRCRAFT FUEL SYSTEMS
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224

AIRCRAFT FUELS
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224
Optoacoustic spectroscopy to detect hydrazine fuels
[AD-A104675] N82-11229

AIRCRAFT HAZARDS
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053
System safety program plan --- electromagnetic pulse testing of the A-7E aircraft
[AD-A104557] N82-11354

AIRCRAFT NOISE
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636
Helicopter rotor trailing edge noise --- noise prediction
[NASA-CR-3470] N82-11859

AIRCRAFT PILOTS
Investigation of spatial disorientation of F-15 Eagle pilots
[AD-A104684] N82-11781

AIRFOIL PROFILES
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

AIRFOILS
Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing
[AD-A104562] N82-11402

AIRFRAMES
Design techniques for mutivariable flight control systems N82-11078

AIRGLOW
The use of DMSP digital data for auroral measurements
[AD-A104392] N82-11707

AIRLINE OPERATIONS
Optimum climb and descent trajectories for airline missions N82-11082

AIRPORT TOWERS
FAA misses opportunities to discontinue or reduce operating hours of some airport traffic control towers
[PB81-224214] N82-11049

AIRPORTS
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636

ALASKA
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532

ALBEDO
Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres
[NASA-CR-164930] N82-12010
The opposition effect of particulate mineral surfaces and condensates: Applications to Saturn's rings N82-12014

ALCOHOLS
Cattail rhizome-derived alcohol
[DE81-028307] N82-11234
Development of a small-scale commercial alcohol dehydration 190 to 200 proof
[DE81-030158] N82-11235
Alcohol fuels in the United States
[DE81-026013] N82-11265

ALGAE
Laser induced fluoroescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758

ALGEBRA
OBJ-1: A study in executable algebraic formal specification
[AD-A104468] N82-11803
Recursive aspects of the theory of real closed fields N82-11849

ALGORITHMS
Algorithm for fuel conservative horizontal capture trajectories
[NASA-TM-81334] N82-11018
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
Algorithm for computing in-situ combustion oil recovery performance
[DE81-030340] N82-11153
Digital SAR processing using a fast polynomial transform N82-11295
Removal of drift from frequency stability measurements N82-11298
Modulation/demodulation techniques for satellite communications. Part 4: Appendices
[NASA-CR-164954] N82-11341
SMMR data set development for GARP --- impact of cross polarization and Faraday rotation on SMMR derived brightness temperatures
[NASA-CR-166721] N82-11512
Distributed computation of fixed points
[AD-A104418] N82-11791
Thermal algorithms analysis --- programming tasks supporting the development of a thermal model of the Earth's surface
[NASA-CR-166716] N82-11800
Condition recognition for a program synthesizer
[AD-A104586] N82-11808
A second-order accurate procedure for solving the boundary layer equations based on the predictor-corrector form of the Crank-Nicolson Scheme
[NAL-TR-655] N82-11826
A two-step approach to finite element ordering
[AD-A104320] N82-11827

ALKALI METALS
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170
Liquid and solid metal embrittlement
[AD-A103048] N82-11187

ALLOYS
Application of solidification theory to rapid solidification processing --- alloys and metallic glasses
[AD-A104561] N82-11214
Experiments in high voltage electron microscopy --- radiation damage in ceramics and alloys
[DE81-025574] N82-11375

ALLUVIUM
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532

ALTERNATING CURRENT
AC firing ability of detonation
[PB81-216053] N82-11272
Test results of ac superconducting cables
[BNL-29291] N82-11371

ALTIMETERS
The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739

ALTITUDE
A simplified procedure for direct determination of real heights from virtual height data
[AD-A104374] N82-11702

ALUMINUM
Aluminum recovery from fly ash and shale-retort wastes
[DE81-027675] N82-11154
Deposition and corrosion phenomena on aluminum surfaces under deluged dry cooling-tower conditions
[DE81-025483] N82-11193
Standard specification for light ladders
[SABS-1304-1980] N82-11277
Quasi-elastic high-pressure waves in 2024 Al and Cu
[DE81-025334] N82-11971

ALUMINUM ALLOYS
Flaw growth of 7075, 7475, 7050 and 7049 aluminum alloy plate in stress corrosion environments: 4-year marine atmosphere results
[NASA-CR-161887] N82-11181
Fatigue characteristics and microstructural analysis of thermomechanically-processed, high-magnesium aluminum-magnesium alloy
[AD-A104589] N82-11189
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls
[DE81-029953] N82-11190
Activity and diffusion of metals in binary aluminum alloys
[DE81-025535] N82-11199
Estimating the statistical properties of crack growth for small cracks
[AD-A104672] N82-11496
Calcium/metal sulfide battery development program
[ANL-81-14] N82-11578

ALUMINUM COMPOUNDS
High-temperature enthalpy and X-ray powder diffraction data for aluminum sulfide (Al_2S)
[PB81-226250] N82-11174
Evaluation of alpha aluminum phosphate for advanced acoustic wave devices
[AD-A104685] N82-11962

ALUMINUM NITRIDES
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220

ALUMINUM OXIDES
Castable high temperature fractory materials
[NASA-CASE-LEW-13080-2] N82-11210

ALUMINUM SILICATES
A structural study of aluminosilicate glasses by Raman spectroscopy N82-11138

AMORPHOUS MATERIALS
Liquid and solid metal embrittlement
[AD-A103048] N82-11187
Microstructure of amorphous and semi-crystalline polymers
[AD-A102853] N82-11216
National photovoltaic program in amorphous materials
[DE81-025906] N82-11609
Ion-reversibility studies in amorphous solids using the two-atom scattering model
[DE81-025188] N82-11886

ANAEROBES
Production and utilization of methane from anaerobic sludge digestion in U.S. wastewater-treatment plants
[DE81-029958] N82-11246
ANALYSIS (MATHEMATICS)
Vector integrals and products of vector measures
N82-11847
ANALYSIS OF VARIANCE
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734
Applications of non-parametric statistics and analysis of variance on sample variances
[NASA-CR-165789] N82-11834
ANALYTIC FUNCTIONS
Multilinear pseudodifferential operators and paraproducts N82-11825
Homeomorphisms of some direct limit spaces
N82-11848
ANECHOIC CHAMBERS
Acoustic scaling: A review of progress to date, and of possible future development
[BBC-RD-1981/6] N82-11855
ANELASTICITY
Contribution to the characterization of the anelastic properties of multi-phase systems
[DE81-025581] N82-11198
ANGULAR DISTRIBUTION
The angular impact distribution of charged particles attracted to a charged cylindrical spacecraft
[AD-A104519] N82-11108
ANGULAR MOMENTUM
Variations in atmospheric angular momentum
[NASA-CR-166712] N82-11690
ANISOTROPIC PLATES
An improved transverse shear deformation theory for laminated antisotropic plates
[NASA-TP-1903] N82-11488
ANNEALING
Processing of silicon solar cells by ion implantation and laser annealing
[NASA-CR-165283] N82-11546
ANNUAL VARIATIONS
Data collection and processing for the ACES --- annual cycle energy system demonstration house
[DE81-030630] N82-11555
OTEC environmental biological oceanographic program
[DE81-027402] N82-11645
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165781] N82-11723
Oceans and ocean currents: Their influence on climate
[DE81-027263] N82-11731
ANTENNA ARRAYS
Virtual center arraying N82-11287
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336
Study of microstrip antenna elements, arrays, feeds, losses, and applications
[AD-A104493] N82-11343
ANTENNA COUPLERS
Antenna-plasma coupling theory for ICRF heating of large Tokamaks
[DE81-029815] N82-11933
ANTENNA DESIGN
Design of throat section of conical corrugated horns N82-11292
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339
ANTENNA FEEDS
Study of microstrip antenna elements, arrays, feeds, losses, and applications
[AD-A104493] N82-11343
ANTENNA RADIATION PATTERNS
Antenna pattern modification for single reflector antennas --- smoothing data from scanning microwave radiometers
[NASA-CR-166711] N82-11338
ANTIFRICTION BEARINGS
Magnetic bearings
[DE81-024201] N82-11473
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
ANTIMISTING FUELS
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230
ANTIMONY
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900
ANTIREFLECTION COATINGS
Antireflecting film development --- for resisting damage from laser pulses
[DE81-030010] N82-11915
APERTURES
Microstructures for high-energy X-ray and particle-imaging applications
[DE81-026531] N82-11899
APPROXIMATION
Numerical differentiation of noisy data
[AD-A104631] N82-11831
Projected Newton methods and optimization of multicommodity flows
[AD-A104419] N82-11844
Search for optimal three-dimensional mapping of the solar corona from K-coronameter data
[PB81-222903] N82-12017
AQUEOUS SOLUTIONS
Adsorption of mixed liquids and solids from water solution onto activated carbon N82-11141
AQUIFERS
Ground-water hydrology of the Dade City area, Pasco County, Florida, with emphasis on the hydrologic effects of pumping from the Floridan aquifer
[PB81-225518] N82-11529
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534
ARC MELTING
The quantitative determination of non-metallic inclusions by a mathematical statistical method
[RAE-LIB-TRANS-2066] N82-11179
ARCHAEOLOGY
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514
ARCHITECTURE
MASEC SOLAR 80 home designs
[DE81-028344] N82-11316
Site And Neighborhood Design (SAND): Development of simplified automated building thermal load procedures, phase 1
[DE81-027138] N82-11317
Sampling design for the 1980 commercial and multifamily residential building survey
[DE81-028783] N82-11320
User needs for solar decision-making tools: The homebuilding industry
[DE81-027293] N82-11325
Racking tests of non-structural building partitions (The behavior of architectural (nonstructural) building components during earthquakes)
[PB81-220790] N82-11328
Solar energy system performance evaluation: Forest City Dillon, Washington, D.C., January 1980 - December 1980
[DE81-028174] N82-11560
Solar energy system performance evaluation: Montecito Pines, Santa Rosa, California, November 1979 - April 1980
[DE81-028175] N82-11561
ARCHITECTURE (COMPUTERS)
Design methodology and development history of an ISO OSI layered architecture for the Canadian Broadcast Telidon system
[CRC-TN-708-E] N82-11337
Architecture tuning of a real-time signal sorter in a dense environment
[AD-A104524] N82-11787
Multiple-instruction, multiple-data path computers: Parallel processing impact on flight simulation software
[AD-A104506] N82-11789
Computer performance prediction of a data flow architecture
[AD-A104587] N82-11792
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795
ARGON PLASMA
Ionization fluctuations in collisional ionizing shock waves --- plasma interactions N82-11864
Temperature measurement in turbulent arcs
N82-11921
ARROW WINGS
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
ARTIFICIAL HARBORS
Effects of planform geometry on tidal flushing and mixing in Marinas
[PB81-219537] N82-11660
ARTIFICIAL INTELLIGENCE
Mechanical transformation of task heuristics into operational procedures
[AD-A104674] N82-11802
Condition recognition for a program synthesizer
[AD-A104586] N82-11808
ASHES
Aluminum recovery from fly ash and shale-retort wastes
[DE81-027675] N82-11154
Trace-element and phase relations in fly ash
[DE81-028555] N82-11643
ASPHALT
SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board
[DE81-903377] N82-11615
ASSURANCE
The quality assurance role in the Deep Space Network N82-11302
ASTRONAUT TRAINING
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097
ASYMMETRY
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036
ASYMPTOTIC SERIES
Estimation problems associated with the Weibull distribution
[DE81-030466] N82-11841
ATLANTIC OCEAN
Some analysis on the diurnal variation of rainfall over the Atlantic Ocean
[NASA-CR-164937] N82-11724
Comparison of ocean and island rainfall in the tropical South Pacific, Atlantic, and Indian Oceans
[PB81-225401] N82-11745
ATMOSPHERIC ATTENUATION
Plasmaspheric, faraday and total electron contents, 1977 and 1978
[AD-A104362] N82-11700
ATMOSPHERIC CHEMISTRY
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637
Effects of acid precipitation on cation transport in New Hampshire forest soils
[DE81-027494] N82-11648
Stratospheric trace gas composition studies utilizing in situ cryogenic, whole-air sampling methods
[AD-A104375] N82-11689
ATMOSPHERIC CIRCULATION
Variations in atmospheric angular momentum
[NASA-CR-166712] N82-11690
A numerical dynamical investigation of the role of subsynoptic inertial an isallobaric adjustments in organizing severe local storm ensembles
N82-11719
The wind climatology of American Samoa
[PB81-221012] N82-11733
Climate Diagnostics Workshop (5th) annual proceedings
[PB81-222200] N82-11735
ATMOSPHERIC COMPOSITION
Report of Lawrence Livermore National Laboratory to the Federal Aviation Agency on the high-altitude pollution program, 1980
[DE81-028264] N82-11647
Selected studies of four high-temperature air-pollution sources N82-11680
Far-infrared measurements of trace gases
[NASA-CR-164965] N82-11698
ATMOSPHERIC DENSITY
Improved simulation of aerosol, cloud, and density measurements by shuttle lidar
[NASA-CR-3473] N82-11688

ATMOSPHERIC DIFFUSION
Mathematical modeling of photochemical air pollution N82-11629
Workbook for estimating the climatology of regional continental scale atmospheric dispersion and deposition over the United States
[PB81-224172] N82-11748
ATMOSPHERIC HEAT BUDGET
Radiation balances and the solar constant
[NASA-TM-76612] N82-12016
ATMOSPHERIC HEATING
Meridional heat transport at the onset of winter stratospheric warming
[NASA-TM-76614] N82-11697
ATMOSPHERIC IONIZATION
On electron beam ionization of air and chemical reactions for disturbed air deionization
[AD-A104517] N82-11871
ATMOSPHERIC MODELS
Improved simulation of aerosol, cloud, and density measurements by shuttle lidar
[NASA-CR-3473] N82-11688
ATMOSPHERIC OPTICS
Data base specifications for the OPAQUE program
[AD-A104340] N82-11709
ATMOSPHERIC PHYSICS
National Center for Atmospheric Research
[NCAR/AR-80] N82-11692
Rocket data of solar EUV flux, thermospheric electron flux and N2 second-positive airglow emission
[AD-A104384] N82-11703
Report on research at AFGL
[AD-A104513] N82-11704
ATMOSPHERIC RADIATION
Data base specifications for the OPAQUE program
[AD-A104340] N82-11709
ATMOSPHERIC REFRACTION
A model of temperature stratification for correction of leveling refraction
[PB81-225435] N82-11744
ATMOSPHERIC TURBULENCE
Wind ripple analysis
[DE81-030129] N82-11044
ATOMIC COLLISIONS
Ion-reversibility studies in amorphous solids using the two-atom scattering model
[DE81-025188] N82-11886
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927
ATOMIC PHYSICS
Bragg curve spectroscopy
[DE81-025827] N82-11161
Workshop on Atomic Physics at the National Synchrotron Light Source
[DE81-023507] N82-11874
ATOMIC STRUCTURE
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76820] N82-11180
ATS 5
ATS-5 12 year in orbit evaluation
[NASA-CR-166728] N82-11101
AURORAS
Imperfect magnetosphere-ionosphere coupling and discrete auroras
[AD-A104509] N82-11699
High latitude electron detectors on Satellite P78-1: Preliminary data results
[AD-A104518] N82-11701
Application of visible monochromatic auroral imaging data for modeling infrared Earth-limb morphology
[AD-A104343] N82-11706
The use of DMSP digital data for auroral measurements
[AD-A104392] N82-11707
Two variable modelling of equatorward boundary of auroral precipitation
[AD-A104378] N82-11708
AUSTENITE
Determination of exact orientation relationships between martensite and austenite in steels by microdiffraction
[LBL-12289] N82-11195
AUTOMATIC CONTROL
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083
Concept for a power system controller for large space electrical power systems
[NASA-TP-1939] N82-11109
Automation of electron diffraction analysis in an analytical electron microscope
[DE81-027255] N82-11159
Traveling-wave maser, closed cycle refrigerator automation N82-11294
Digital control of machine tools
[DE81-029950] N82-11476
AUTOMATIC FLIGHT CONTROL
Optimal control in the lunar module digital autopilot N82-11085
AUTOMATIC PILOTS
Optimal control in the lunar module digital autopilot N82-11085
AUTOMATION
Condition recognition for a program synthesizer
[AD-A104586] N82-11808
AUTOMOBILE ENGINES
An evaluation of three-way control single and dual bed catalysts as applied to heavy-duty gasoline engines
[PB81-224982] N82-11477
EPA evaluation of the FUEL-MAX device under Section 511 of the Motor Vehicle Information and Cost Savings Act
[PB81-229866] N82-11479
EPA evaluation of the Automotive Cylinder Deactivator System (ACDS) under Section 511 of the Motor Vehicle Information and Cost Saving Act
[PB81-228256] N82-11480
Jet impingement heat transfer enhancement for the GPU-3 Stirling engine
[NASA-TM-82727] N82-11993
Assessment of flywheel system benefits in selected vehicle applications
[DE81-025976] N82-11997
AUTOMOBILE FUELS
Alcohol fuels in the United States
[DE81-026013] N82-11265
Third automotive fuel economy research contractors coordination meeting
[PB81-222754] N82-11627
Liquid-liquid chromatography fractionation of organic compounds in complex mixtures: Application to automobile exhaust
[DE81-030743] N82-11650
AUTOREGRESSIVE PROCESSES
Properties of batch means from stationary ARMA (1, 1) time series
[AD-A104245] N82-11839
AUXILIARY POWER SOURCES
The use of remote active deflectors for feeding UHF relay stations
[BBC-RD-1981/5] N82-11334
Irrigation market for solar thermal parabolic dish systems
[NASA-CR-164955] N82-11549
AUXILIARY PROPULSION
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems. Volume 1: Executive summary
[NASA-CR-165502-VOL-1] N82-11110
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems, volume 2
[NASA-CR-165502-VOL-2] N82-11111
AVIONICS
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064

B

B STARS
Nonradial pulsations of upsilon Orionis and supergiants
[DE81-025338] N82-12005
BACKSCATTERING
Ion-reversibility studies in amorphous solids using the two-atom scattering model
[DE81-025188] N82-11886
The deconvolution of aerosol backscattered optical pulses to obtain system-independent aerosol signatures
[AD-A104578] N82-11914
BACTERIA
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607
BALL BEARINGS
Quiet bearing surface characterization
[AD-A104412] N82-11472
BALLOON-BORNE INSTRUMENTS
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438
BANDPASS FILTERS
Cryogenic filters for RFI protection N82-11293
BANDWIDTH
Closed form evaluation of symmetric two-sided complex integrals N82-11299
Research on narrowband communications
[AD-A104296] N82-11345
BAROCLINIC WAVES
Frontogenesis in the planetary boundary layer of an amplifying, two-dimensional baroclinic wave N82-11721
BAROCLINITY
An inverse technique for determination of mean ocean circulation N82-11756
BATCH PROCESSING
Properties of batch means from stationary ARMA (1, 1) time series
[AD-A104245] N82-11839
BAYES THEOREM
A simulation analysis of the effectiveness of Markovian control and Bayesian control --- cost analysis
[AD-A104635] N82-11840
BAYS (TOPOGRAPHIC FEATURES)
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669
BEACHES
A method for using aerial photos in delineating historic patterns of beach accretion and retreat
[PB81-223836] N82-11536
BEAM INJECTION
Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888
Storage ring injection
[DE81-023846] N82-11901
BEAM INTERACTIONS
Nonlinear waves on charged particle beams N82-11865
BEAM WAVEGUIDES
Non-solar power tests at the Central Receiver Test Facility (CRTF)
[DE81-026955] N82-11604
BEAMS (SUPPORTS)
Seismic resistance characteristics of reinforced concrete beam-supported floor slabs in building structures: Contribution of floor systems to earthquake resistance of building structural frames
[PB81-219172] N82-11326
BEARINGS
Rehabilitation of 64-meter-antenna radial bearing N82-11301
BEDROCK
Bearing capacity and characterization of compressible Clayey and Silty Foundation soils in Oklahoma
[PB81-231607] N82-11330
BENDING
The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics
[RAE-LIB-TRANS-2052] N82-11205
BERING SEA
Ice conditions in the eastern Bering Sea from NOAA and LANDSAT imagery: Winter conditions 1974, 1976, 1977, 1979
[PB81-220188] N82-11537
BERNOULLI THEOREM
Recent advances in statistical methods for system reliability using Bernoulli sampling of components
[AD-A104436] N82-11482
BERYLLIUM
Shock compression of beryllium
[DE81-024062] N82-11200
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927
BERYLLIUM 10
A review and interpretation of recent cosmic ray beryllium isotope measurements
[NASA-CR-164967] N82-12020

BESSEL FUNCTIONS
Special functions and harmonic analysis on P sub n N82-11824
BETA PARTICLES
Heavy ion fusion program at Argonne [DE81-023905] N82-11902
BIAS
Estimation of radar range biases at multiple sites [AD-A104306] N82-11346
BIBLIOGRAPHIES
Selected bibliography of NACA-NASA aircraft icing publications [NASA-TM-81651] N82-11053
Technology for large space systems: A special bibliography [NASA-SP-7046(05)] N82-11093
A compilation of thermodynamic and transport properties of aqueous sulfuric acid [PB81-229171] N82-11172
NASA Patent Abstracts bibliography: A continuing bibliography, section 1, abstracts. Supplement 19 [NASA-SP-7039(19)-SEC-1] N82-11981
NASA Patent Abstracts Bibliography: A continuing bibliography, section 2, indexes. Supplement 19 [NASA-SP-7039(19)-SEC-2] N82-11982
BINARY ALLOYS
Fatigue characteristics and microstructural analysis of thermomechanically-processed, high-magnesium aluminum-magnesium alloy [AD-A104589] N82-11189
Activity and diffusion of metals in binary aluminum alloys [DE81-025535] N82-11199
BINARY STARS
Linear and nonlinear theory study of Alpha Virginis [DE81-025335] N82-12006
BINDERS (MATERIALS)
Modified-sulfur cements for use in concretes, flexible pavings, coatings, and grouts [PB81-226870] N82-11333
BINDING
Universal binding energy relations in metallic adhesion [NASA-TM-82706] N82-11183
BIOCONVERSION
Cattail rhizome-derived alcohol [DE81-028307] N82-11234
Peat biogasification development program [DE81-028299] N82-11243
Production and utilization of methane from anaerobic sludge digestion in U.S. wastewater-treatment plants [DE81-029958] N82-11246
BIODEGRADABILITY
Stabilization characteristics of deposits of biologic solids generated in aerated lagoons [PB81-224297] N82-11668
BIOINSTRUMENTATION
Logic-controlled occlusive cuff system [NASA-CASE-MSC-14836-1] N82-11770
BIOMASS ENERGY PRODUCTION
Cattail rhizome-derived alcohol [DE81-028307] N82-11234
Development of a small-scale commercial alcohol dehydration 190 to 200 proof [DE81-030158] N82-11235
Near-term goals for alcohol fuels from biomass: An overview of resource requirements, land use, environmental, and socioeconomic impacts --- ethyl alcohol production [DE81-029987] N82-11245
Transportation fuels from synthetic gas [DE81-029614] N82-11258
Environmental research plan for gas supply technologies. Volume 2: Environmental research plan [PB81-222317] N82-11274
Thermal and electrochemical biomass conversion at SERI [DE81-030507] N82-11563
Environmental research plan for gas supply technologies. Volume 1: Executive summary [PB81-222309] N82-11657
BIOMEDICAL DATA
Remote Medical Diagnosis System RMDS design review meeting minutes [AD-A104555] N82-11772
BIOSYNTHESIS
Peat biogasification development program [DE81-028299] N82-11243
Hydrogen production from the photosynthetic bacterium Rhodopseudomonas sphaeroides [DE81-025831] N82-11256
Biologically assisted photoelectrochemical cell [DE81-025905] N82-11607
BIPOLARITY
R&D services to develop an improved isolation technology radiation hardened bipolar integrated circuits (PEDIC) [AD-A104657] N82-11367
BLANKETS (FUSION REACTORS)
Source-to-incident-flux relation in a Tokamak blanket module [DE81-026524] N82-11941
BLAST LOADS
The effects of jet exhaust blast impingements on graphite-epoxy composites --- F-18 aircraft [AD-A104622] N82-11136
Dynamic measurement of Poisson's ratio in granular materials at 0.2 to 0.8 GPa [DE81-027559] N82-11504
BLOOD CIRCULATION
On the active part played by the heart in the venous return of the blood [RAE-LIB-TRANS-2017] N82-11766
BLOOD FLOW
Logic-controlled occlusive cuff system [NASA-CASE-MSC-14836-1] N82-11770
BLOOD PRESSURE
Effects of curative treatment emphasizing endurance training on the performance and blood pressure of hypertensive and normotensives [NASA-TM-76520] N82-11771
BLUFF BODIES
A wake source model for non-symmetric flow past bluff bodies in two-dimensional flow [C-OF-A-MEMO-8109] N82-11037
BODIES OF REVOLUTION
Generation of axi-symmetric body shapes in subsonic flow by means of polynomial distributions of sources and doublets along the axis of symmetry [C-OF-A-MEMO-8110] N82-11038
BODY CENTERED CUBIC LATTICES
Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron [DE81-025540] N82-11973
BODY-WING CONFIGURATIONS
Acta mechanica sinica [AD-A105184] N82-11014
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016
BOEING 747 AIRCRAFT
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft [NASA-TM-83214] N82-11860
BOILERS
The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute [PB81-226813] N82-11625
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2 [PB81-222267] N82-11654
Magnetohydrodynamic research program of the MHD Energy center at Mississippi State University and structural features of MHD radiant boilers [DE81-029901] N82-11934
BOMBS (ORDNANCE)
Use of a hybrid computer for the flight simulation of a bomb/parachute system [DE81-025141] N82-11797
BONDING
Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics [DE81-030423] N82-11218
BONES
Intercomparison of techniques for the non-invasive measurement of bone mass [DE81-029921] N82-11773
BORIDES
Certain physical properties of cobalt and nickel borides [NASA-TM-76623] N82-11185
BORON ALLOYS
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells [DE81-027234] N82-11557
BOROSILICATE GLASS
Comparison of costs for solidification of high-level radioactive waste solutions: Glass monoliths vs. metal matrices [ANL-80-121] N82-11890
Evaluation and review of alternative waste forms for immobilization of high-level radioactive wastes [DE81-026323] N82-11909
BOUNDARY LAYER CONTROL
New estimation method for flutter or divergence boundary from random responses at subcritical speeds [NAL-TR-667T] N82-11034
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction [NASA-TP-1902] N82-11391
BOUNDARY LAYER EQUATIONS
A second-order accurate procedure for solving the boundary layer equations based on the predictor-corrector form of the Crank-Nicolson Scheme [NAL-TR-655] N82-11826
BOUNDARY LAYER FLOW
Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing [AD-A104562] N82-11402
BOUNDARY LAYER SEPARATION
Acta Mechanica Sinica (selected articles) [AD-A105636] N82-11019
Prediction of turbulent boundary layer separation N82-11022
A summary of V/STOL inlet analysis methods [NASA-TM-82725] N82-11043
BOUNDARY LAYERS
Aircraft wing trailing-edge noise [NASA-CR-164952] N82-11039
BOUNDARY VALUE PROBLEMS
Electromagnetic scattering by targets over a real Earth [AD-A104492] N82-11347
Development of prediction method for transonic shock induced separated flow [AD-A104566] N82-11403
A second-order accurate procedure for solving the boundary layer equations based on the predictor-corrector form of the Crank-Nicolson Scheme [NAL-TR-655] N82-11826
Boundary observability and controllability for diffusion equations [AD-A104293] N82-11829
BRAGG CURVE
Bragg curve spectroscopy [DE81-025827] N82-11161
BRAKES (FOR ARRESTING MOTION)
Standard specification for air-brake reservoirs [SABS-1312-1980] N82-11464
BRAYTON CYCLE
Light-commercial Brayton/Rankine space-conditioning system [DE81-024137] N82-11586
BRAZIL
Assessment of oil-shale technology in Brazil [DE81-027574] N82-11249
BREATHING APPARATUS
Recommended guidelines for oxygen self-rescuers. Volume 1: Underground coal mining [PB81-225872] N82-11782
Recommended guidelines for oxygen self-rescuers. Volume 2: Appendices [PB81-225880] N82-11783
BRIDGES (STRUCTURES)
Jointless bridges [PB81-227738] N82-11332
BRIGHTNESS TEMPERATURE
Antenna pattern modification for single reflector antennas --- smoothing data from scanning microwave radiometers [NASA-CR-166711] N82-11338
SMMR data set development for GARP --- impact of cross polarization and Faraday rotation on SMMR derived brightness temperatures [NASA-CR-166721] N82-11512
BRINES
Analysis of saturated solar pond characteristics, volume 1 [DE81-030820] N82-11618

Geothermal environmental assessment: Behavior of selected geothermal brine contaminants in plants and soils
[PB81-222333] N82-11671

BROADBAND
Wideband optical measurements of ultrasonic pulses N82-11132
Dual differential interferometer for measurements of broadband surface acoustic waves N82-11133

BROMIDES
Reaction of oxygen atoms with ethylene and vinylbromide
[DE81-025206] N82-11879

BUBBLES
Acoustic cavitation studies
[AD-A104409] N82-11863
Light scattering by bubbles in liquids or in glass
[AD-A104241] N82-11912

BUFFERS (CHEMISTRY)
Static continuous electrophoresis device
[NASA-CASE-MFS-25306-1] N82-11147

BURNING RATE
The effects of gaseous atmospheres on the performance characteristics of aluminum-sodium nitrate flares
[AD-A104383] N82-11227

C

CADMIUM
Speciation of labile and quasi-labile metal complex systems using the Kalman filter
[DE81-025678] N82-11194

CADMIUM SULFIDES
Cadmium sulfide/copper sulfide heterojunction cell research by sputter deposition
[DE81-026219] N82-11553

CALCIUM
Activity and diffusion of metals in binary aluminum alloys
[DE81-025535] N82-11199

CALCIUM FLUORIDES
Calcium/metal sulfide battery development program
[ANL-81-14] N82-11578

CALCIUM METABOLISM
Human lymphocyte calcium metabolism N82-11769

CALCULUS
Elements of programming linguistics. Part 1: The lambda calculus and its implementation
[AD-A104345] N82-11805
Programming with a relational calculus
[AD-A104650] N82-11809

CALIBRATING
Low-cost solar array project: Four absolute cavity radiometer (pyrheliometer) intercomparisons at New River, Arizona: Radiometer standards
[NASA-CR-164950] N82-11435
Calibration of a laminar flowmeter: The data and correlations
[DE81-025227] N82-11441
Calibration of a laminar flowmeter
[DE81-024423] N82-11442
Guide to the evaluation and use of an atomic absorption spectrophotometer
[PB81-222853] N82-11444
Engineering Analysis System (EASY)
[DE81-027508] N82-11846

CALIFORNIA
The planning and management of California's coastal resources
[PB81-224057] N82-11670

CALLISTO
The morphology and evolution of Ganymede and Callisto N82-12013

CAPACITORS
Elastomer unistructure insulators
[DE81-024366] N82-11219
Performance of a 100-kV, 78kJ electric-gun system
[DE81-025603] N82-11374
High energy density capacitor testing for the AFWL SHIVA
[DE81-023688] N82-11379
Advanced development of electrical-energy-storage components for high reliability applications
[DE81-025384] N82-11591

CARBON
Beach foreshore sedimentation by organic and inorganic processes N82-11630

CARBON DIOXIDE LASERS
Submicron-particle absorption spectroscopy by photothermal modulation of MIE scattered light
[DE81-025096] N82-11160
Mass spectrometry of the CO2 laser plasma
[AD-A104344] N82-11454
Determination of pulsed CO2 laser damage thresholds of optical surfaces
[AD-A104424] N82-11456

CARBON FIBER REINFORCED PLASTICS
The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics
[RAE-LIB-TRANS-2052] N82-11205

CARBON FIBERS
Carbon/graphite fibers: Environmental exposures and potential health implications
[PB81-229692] N82-11780

CARBON MONOXIDE
Studies of the kinetics and mechanism of gas-surface reactions on metal and metal oxide surfaces N82-11140
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/1] N82-11259
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/2] N82-11260
Observations of molecular clouds containing reflection nebulae N82-11999

CARBONACEOUS MATERIALS
Transport characteristics of alternate slurry fuels
[DE81-028580] N82-11255
Exploration of coal and anthracitic carbonaceous shale resources, Narragansett Basin, Massachusetts, and Rhode Island
[DE81-030895] N82-11523

CARBONATES
A review of the behaviour and engineering properties of carbonate soils
[PB81-226722] N82-11331

CARBURETORS
Evaluation of the micro-carburetor
[NASA-CR-164958] N82-11994

CARDIOLOGY
On the active part played by the heart in the venous return of the blood
[RAE-LIB-TRANS-2017] N82-11766

CASCADE FLOW
Journal of Engineering Thermophysics (selected articles)
[AD-A105604] N82-11023
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade N82-11024
Calculations of transonic potential flow over cascades
[NASA-CR-165471] N82-11041
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069

CASPIAN SEA
Petroleum geology and resource assessment of the middle Caspian Basin, USSR, with special emphasis on the Uzen field
[DE81-029951] N82-11518

CASSEGRAIN ANTENNAS
Surface resistivity measurements of candidate subreflector surfaces N82-11300

CASTINGS
Castable high temperature fractory materials
[NASA-CASE-LEW-13080-2] N82-11210

CATALYSIS
Transportation fuels from synthetic gas
[DE81-029614] N82-11258
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/1] N82-11259
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/2] N82-11260

CATALYSTS
Assessment of advanced coal gasification processes
[NASA-CR-164949] N82-11146
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE81-028209] N82-11168
An evaluation of three-way control single and dual bed catalysts as applied to heavy-duty gasoline engines
[PB81-224982] N82-11477

CATALYTIC ACTIVITY
Coal hydrogenation via bonding of metallic compounds to coal, part 1. Solubilization of Illinois bituminous coal - the critical importance of methylene group cleavage, part 2
[DE81-027562] N82-11236

CATASTROPHE THEORY
Is geothermal simulation a catastrophe?
[DE81-026750] N82-11588

CATHODES
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 1 — underground transmission lines
[DE81-904195] N82-11382
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 2 — potential gradients and polarization curves
[DE81-904210] N82-11383

CATIONS
Effects of acid precipitation on cation transport in New Hampshire forest soils
[DE81-027494] N82-11648

CAUCHY PROBLEM
Linear evolution equations of hyperbolic type in a locally convex space N82-11850

CAUSES
Prediction, diagnosis, and causal thinking in forecasting
[AD-A104372] N82-11843

CAVITATION FLOW
Acoustic cavitation studies
[AD-A104409] N82-11863

CAVITIES
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336

CELL ANODES
Calcium/metal sulfide battery development program
[ANL-81-14] N82-11578

CELL DIVISION
Molecular events basic to cellular radiation response
[DE81-027898] N82-11778

CEMENTS
Modified-sulfur cements for use in concretes, flexible pavings, coatings, and grouts
[PB81-226870] N82-11333

CENTRAL AMERICA
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

CENTRAL PROCESSING UNITS
Concept for a power system controller for large space electrical power systems
[NASA-TP-1939] N82-11109

CENTRIFUGAL COMPRESSORS
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429

CENTRIFUGAL PUMPS
Liquid oxygen turbopump technology
[NASA-CR-165487] N82-11468

CERAMICS
Castable high temperature fractory materials
[NASA-CASE-LEW-13080-2] N82-11210
Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics
[DE81-030423] N82-11218
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220
Innovative technology for fabrication of ceramics: EDS rapid solidification process application to specialized materials
[PB81-214868] N82-11222
Experiments in high voltage electron microscopy — radiation damage in ceramics and alloys
[DE81-025574] N82-11375

CESIUM 137
Use of polyethers in the treatment of acidic high-activity nuclear wastes
[DE81-027087] N82-11895
CHANNEL CAPACITY
RFI channels, 2 N82-11290
The R sub 0 parameter for the Gaussian channel N82-11291
CHANNELS (DATA TRANSMISSION)
RFI channels, 2 N82-11290
The R sub 0 parameter for the Gaussian channel N82-11291
Multiaccess of a slotted channel by finitely many users
[AD-A104417] N82-11349
CHARACTERIZATION
Quiet bearing surface characterization
[AD-A104412] N82-11472
CHARGE COUPLED DEVICES
Binary/analog CCD correlator development
[AD-A104438] N82-11363
CHARGE DISTRIBUTION
Investigation of the zinc electrode reaction --- nickel zinc batteries
[DE81-030221] N82-11368
CHARGE EXCHANGE
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927
CHARGE TRANSFER
An electrostatic model for energies of molecules in solution N82-11869
CHARGED PARTICLES
The angular impact distribution of charged particles attracted to a charged cylindrical spacecraft
[AD-A104519] N82-11108
Nonlinear waves on charged particle beams N82-11865
A model of the normal and null states of pulsars
[PB81-215907] N82-12011
CHEBYSHEV APPROXIMATION
Chebyshev polynomial approximation in the OPAQUE program
[AD-A104317] N82-11638
CHELATES
The use of lanthanide chelates as selective complexing sorbents for gas chromatography N82-11139
High-pressure optical studies
[DE81-025577] N82-11918
CHEMICAL ANALYSIS
Techniques for geothermal liquid sampling and analysis
[DE81-030151] N82-11149
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-029125] N82-11166
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-025961] N82-11167
Manual of analytical quality control for pesticides and related compounds in human and environmental samples
[PB81-222721] N82-11171
Informational report on the measurement and characterization of diesel exhaust emissions
[PB81-221251] N82-11175
Response of portable VOC analyzers to chemical mixtures
[PB81-234262] N82-11176
Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177
Survey of particulate emission macro- and micro-sampling and sizing methods
[DE81-028348] N82-11642
Molecular-beam system for the study of transient combustion processes
[DE81-030663] N82-11872
CHEMICAL COMPOSITION
Effects of components of synfuels on soot formation
[DE81-027961] N82-11242
CHEMICAL EQUILIBRIUM
One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158
CHEMICAL EXPLOSIONS
Deflagration-to-Detonation Transition (DDT) project
[DE81-030979] N82-11241
Preventing large-battery explosions
[PB81-227373] N82-11628
CHEMICAL PROPERTIES
Physical characterization of electronic materials
[AD-A104494] N82-11135
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 1, phase 2
[AD-A104552] N82-11484
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 2, phase 2
[AD-A104553] N82-11485
Altered tissue reactivity and interactions between chemicals
[DE81-023189] N82-11777
CHEMICAL PROPULSION
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems. Volume 1: Executive summary
[NASA-CR-165502-VOL-1] N82-11110
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems, volume 2
[NASA-CR-165502-VOL-2] N82-11111
CHEMICAL REACTIONS
Shock-induced organic chemistry
[DE81-024442] N82-11115
Vertical combustor for refuse combustion
[DE81-030002] N82-11152
Investigation of mechanisms of hydrogen transfer in coal hydrogenation
[DE81-030492] N82-11165
Response of portable VOC analyzers to chemical mixtures
[PB81-234262] N82-11176
Chemical heat pump program: An overview
[DE81-025086] N82-11414
Interface reactions in Mg/Zn3P2 solar cells
[DE81-025773] N82-11597
Altered tissue reactivity and interactions between chemicals
[DE81-023189] N82-11777
CHEMICAL REACTORS
Fluidized bed coal combustion reactor
[NASA-CASE-NPO-14273-1] N82-11144
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE81-028209] N82-11168
Solar coal-gasification reactor for hydrocarbon-free synthesis gas
[DE81-026600] N82-11247
Solvent-Refined-Coal (SRC) process
[DE81-029628] N82-11268
Kinetics of NO/ sub x formation during early stages of pulverized-coal combustion
[DE81-029071] N82-11641
CHEMISORPTION
Surface analysis by Fourier transform infrared (Ftir) spectroscopy
[DE81-025741] N82-11150
Adsorption of hydrogen on iron and the hydrogen embrittlement of steel
[DE81-025164] N82-11196
Trapping and surface permeation of deuterium in Fe, Ni and stainless steel: An ion-beam study
[DE81-023303] N82-11201
CHIPS (ELECTRONICS)
Manufacturing methods and technology engineering for tape chip carrier
[AD-A104393] N82-11365
CHIRP SIGNALS
Binary/analog CCD correlator development
[AD-A104438] N82-11363
CHLORINATION
Coal desulfurization by low temperature chlorinolysis, phase 3
[NASA-CR-164957] N82-11145
CHLOROPHYLLS
Development of the coastal zone color scanner for NIMBUS 7. Volume 1: Mission objectives and instrument description
[NASA-CR-166720-VOL-1] N82-11511
CHROMIUM
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900
CHROMIUM STEELS
Activation of superalloys and stainless steels for chromium plating
[AD-A104313] N82-11188
CHROMOSPHERE
Optical and ultraviolet studies of stellar chromospheres of lambda Andromedae and other late-type stars N82-12003
Theoretical studies of chromospheres and winds in cool stars
[NASA-CR-164969] N82-12004
CIRCULAR CYLINDERS
Electromagnetic field mapping of cylinder and missile nosecone
[AD-A104312] N82-11104
Surface-tension induced instabilities: Effects of lateral boundaries
[NASA-CR-165530] N82-11390
CLADDING
Zircaloy cladding: Tough containment for spent fuel storage
[DE81-024105] N82-11896
CLAMPS
Clamp-mount device
[NASA-CASE-MFS-25510-1] N82-11470
CLASSICAL MECHANICS
Classical field theory with Z(3) symmetry
[DE81-027089] N82-11969
CLASSIFICATIONS
A review of the behaviour and engineering properties of carbonate soils
[PB81-226722] N82-11331
CLASSIFIERS
Architecture tuning of a real-time signal sorter in a dense environment
[AD-A104524] N82-11787
CLAYS
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663
CLEANING
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls
[DE81-029953] N82-11190
CLIMATE
Oceans and ocean currents: Their influence on climate
[DE81-027263] N82-11731
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734
Climate Diagnostics Workshop (5th) annual proceedings
[PB81-222200] N82-11735
Hawaii mesoscale energy and climate project (HAMEC). 2: P-3 aircraft data sets
[PB81-224198] N82-11747
CLIMATOLOGY
The wind climatology of American Samoa
[PB81-221012] N82-11733
Workbook for estimating the climatology of regional continental scale atmospheric dispersion and deposition over the United States
[PB81-224172] N82-11748
CLINICAL MEDICINE
Integrating medical knowledge and clinical data banks: Discovery and representation of causal relationships from a large time-oriented clinical database. The RX project
[PB81-227233] N82-11987
CLOUD COVER
Improved simulation of aerosol, cloud, and density measurements by shuttle lidar
[NASA-CR-3473] N82-11688
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165781] N82-11723
Estimates for the probabilities of surface-to-air cloud-free lines-of-sight and low cloud statistics from ship observations. Part 1: Fifteen marine locations
[AD-A104633] N82-11730
An analysis of cloud property retrieval using infrared sounder data
[PB81-221608] N82-11732

Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres
[NASA-CR-164930] N82-12010

CLOUD PHYSICS
Numerical simulation of the dynamics, cloud microphysics and radar echo structures of tropical and mid-latitude convection N82-11722
An analysis of cloud property retrieval using infrared sounder data
[PB81-221606] N82-11732

CMOS
Modeling and elimination of latch-up in bulk CMOS integrated circuits
[DE81-017413] N82-11377

COAL
Coal desulfurization by low temperature chlorinolysis, phase 3
[NASA-CR-164957] N82-11145
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148
Studies for the stabilization of coal-oil mixtures
[DOE/ET-10746/T1] N82-11156
One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158
Laboratory study for removal of organic sulfur from coal
[DE81-025132] N82-11239
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities
[DE81-025518] N82-11240
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248
Preignition volatile yield as related to coal characteristics
[DE81-027584] N82-11250
Transport characteristics of alternate slurry fuels
[DE81-028580] N82-11255
Gas recovery from coal deposits
[PB81-222291] N82-11271
Coal gasifier parameters influencing environmental pollutant production
[PB81-221301] N82-11273
Geologic considerations in underground coal mining system design
[NASA-CR-164961] N82-11516
Planning a comprehensive program for exploration of the anthracite deposits of the Narragansett Basin of Massachusetts and Rhode Island, phase 1 and 2
[DE81-028490] N82-11519
Exploration of coal and anthracitic carbonaceous shale resources, Narragansett Basin, Massachusetts, and Rhode Island
[DE81-030895] N82-11523
Energy analysis of human ecosystems in an Appalachian coal county
[DE81-025177] N82-11574
Development, testing, and evaluation of MHD materials and component designs. Volume 1: Executive summary
[DE81-026203] N82-11947

COAL DERIVED GASES
Feasibility and economic study of medium-BTU coal gas blended with high-BTU by product gas as an industrial energy source at Billings, Montana
[DE81-025166] N82-11237
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities
[DE81-025518] N82-11240
Solar coal-gasification reactor for hydrocarbon-free synthesis gas
[DE81-026600] N82-11247

COAL DERIVED LIQUIDS
Effects of components of synfuels on soot formation
[DE81-027961] N82-11242
Solid and hazardous energy wastes: Synfuels. 1: Review of research activities
[DE81-028503] N82-11644

COAL GASIFICATION
Assessment of advanced coal gasification processes
[NASA-CR-164949] N82-11146
Materials technology for coal-conversion processes
[DE81-028474] N82-11169
Alternative fuel for the steel industry of Northern Indiana: A prefeasibility study of a central coal gasification project
[DE81-029314] N82-11233
Conceptual design for a multi-user medium BTU coal gasification complex. Volume 1: Executive summary
[DE81-027139] N82-11238
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities
[DE81-025518] N82-11240
Solar coal-gasification reactor for hydrocarbon-free synthesis gas
[DE81-026600] N82-11247
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248
Surface coal gasification
[DE81-030183] N82-11253
Advanced-gasification processes
[DE81-030184] N82-11254
LLNL underground coal gasification project
[DE81-030634] N82-11267
Coal gasifier parameters influencing environmental pollutant production
[PB81-221301] N82-11273
Novel design of pressure vessels and thermal shields in coal gasifiers
[DE81-025828] N82-11474
Great Plains gasification project, Mercer County, North Dakota; water assessment report section 13(c)
[PB81-216111] N82-11524
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525
Low-Btu-gasifier emissions toxicology
[DE81-031000] N82-11651
Vapor-phase cracking and wet oxidation as potential pollutant control techniques for coal gasification
[PB81-219594] N82-11661
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE81-027131] N82-11712

COAL LIQUEFACTION
Investigation of mechanisms of hydrogen transfer in coal hydrogenation
[DE81-030492] N82-11165
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-029125] N82-11166
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-025961] N82-11167
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE81-028209] N82-11168
Materials technology for coal-conversion processes
[DE81-026474] N82-11169
Coal hydrogenation via bonding of metallic compounds to coal, part 1. Solubilization of Illinois bituminous coal - the critical importance of methylene group cleavage, part 2
[DE81-027562] N82-11236
Solvent-Refined Coal-1 Demonstration Project. Final environmental impact statement, Volume 1 of 2 — coal liquefaction plant at Newman, Kentucky
[DE81-025983] N82-11252
Advanced-gasification processes
[DE81-030184] N82-11254
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/1] N82-11259
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/2] N82-11260
Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269
Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270

COAL UTILIZATION
Fluidized bed coal combustion reactor
[NASA-CASE-NPO-14273-1] N82-11144
Tennessee Valley Authority atmospheric fluidized-bed combustor simulation
[DE81-030262] N82-11151
Possible use of coal in Hawaii, 1980 - 2000
[DE81-028266] N82-11263
Lewis Research Center's coal-fired, pressurized, fluidized-bed reactor test facility
[NASA-TM-81616] N82-11397
National coal-market conditions for the year 2000: Regional-issue identification and analysis, high scenario
[DE81-026425] N82-11988

COASTAL ECOLOGY
The planning and management of California's coastal resources
[PB81-224057] N82-11670

COASTAL ZONE COLOR SCANNER
Development of the coastal zone color scanner for NIMBUS 7. Volume 1: Mission objectives and instrument description
[NASA-CR-166720-VOL-1] N82-11511

COASTS
Identification of geopressured occurrences outside of the Gulf Coast
[DE81-025511] N82-11522

COATINGS
Cadmium sulfide/copper sulfide heterojunction cell research by sputter deposition
[DE81-026219] N82-11553

COBALT
Application of a rare-earth cobalt magnet to synchronous motors
[NAL-TR-656] N82-11358

COBALT ALLOYS
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76620] N82-11180
Stability of permanent-magnet parameters
[DE81-027013] N82-11852

COBALT COMPOUNDS
Certain physical properties of cobalt and nickel borides
[NASA-TM-76623] N82-11185

COBOL
COBOL Compiler: Mohawk data sciences MDS COBOL release 12 ANSI 74, series 21-models 40, 50, series 21 operating system 2
[PB81-226425] N82-11798
Perkin-Elmer COBOL R06 Perkin-Elmer model 3240 OS/32 REV 05.02
[PB81-223885] N82-11799

CODING
RFI channels, 2 N82-11290

COGENERATION
Preliminary evaluation of advanced coal-based electricity-generating technologies by means of system-integration analysis
[DE81-029989] N82-11573
Analysis of the fuel and cost effects of interfacing utilities and small-power cogenerators
[DE81-028495] N82-11579

COHERENT ACOUSTIC RADIATION
Optical fiber interferometer for the study of ultrasonic waves in composite materials
[NASA-CR-164916] N82-11121

COHESION
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183

COLD FRONTS
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-78617] N82-11725

COLD WEATHER
Design, operation and performance of a ground coupled heat pump system in a cold climate
[DE81-024257] N82-11412

COLLISION AVOIDANCE
Threat Alert and Collision Avoidance System (TCAS) Symposium
[AD-A104563] N82-11047

COLLISIONS
Side impact sled and padding development
[PB81-217952] N82-11092

COLOR PHOTOGRAPHY
Method for retarding dye fading during archival storage of developed color photographic film — inert atmosphere
[NASA-CASE-MFS-23250-1] N82-11432

COLORADO
Gas recovery from coal deposits
[PB81-222291] N82-11271
Waste-assimilation capacity of the Arkansas River in Pueblo County, Colorado, as it relates to water-quality guidelines and stream classification
[PB81-227340] N82-11540
Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado
[PB81-224313] N82-11667
Geology of the nahcolite deposits and associated oil shales of the Green River Formation in the Piceance Creek Basin, Colorado N82-11683
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734

COMBUSTION
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148
Algorithm for computing in-situ combustion oil recovery performance
[DE81-030340] N82-11153
One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158
Numerical model study of burning and detonation in small PETN-loaded assemblies
[DE81-028594] N82-11162
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654
Molecular-beam system for the study of transient combustion processes
[DE81-030663] N82-11872

COMBUSTION CHAMBERS
Fluidized bed coal combustion reactor
[NASA-CASE-NPO-14273-1] N82-11144
Tennessee Valley Authority atmospheric fluidized-bed combustor simulation
[DE81-030262] N82-11151
Vertical combustor for refuse combustion
[DE81-030002] N82-11152
One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158
Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182

COMBUSTION CONTROL
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248

COMBUSTION PHYSICS
Vertical combustor for refuse combustion
[DE81-030002] N82-11152
An investigation of the combustion process in solid fuel ramjets
[AD-A104803] N82-11232
Kinetics of NO/ sub x formation during early stages of pulverized-coal combustion
[DE81-029071] N82-11641
Development, testing, and evaluation of MHD materials and component designs. Volume 1: Executive summary
[DE81-026203] N82-11947

COMBUSTION PRODUCTS
Preignition volatile yield as related to coal characteristics
[DE81-027584] N82-11250
Survey of particulate emission macro- and micro-sampling and sizing methods
[DE81-028348] N82-11642
Solid and hazardous energy wastes: Synfuels. 1: Review of research activities
[DE81-028503] N82-11644
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654

COMBUSTION STABILITY
Report of laser activities: 1978 - 1979
[DE81-028997] N82-11459

COMETARY ATMOSPHERES
Radiative transfer in cometary dust atmospheres: Critique of recent developments
[NASA-CR-164946] N82-12015

COMMERCIAL AIRCRAFT
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068

COMMERCIAL ENERGY
Sampling design for the 1980 commercial and multifamily residential building survey
[DE81-028783] N82-11320
Interrelationships of energy and the economy: A supplement to the National Energy Policy Plan required by Title VIII of the US Department of Energy Organization Act (Public Law 95-91)
[DE81-027526] N82-11613

COMMUNICATION CABLES
Investigation of the strength of shielded and unshielded underwater electrical cables
[AD-A104314] N82-11364

COMMUNICATION EQUIPMENT
User's guide: Voice and data communications protection
[PB81-221509] N82-11356

COMMUNICATION NETWORKS
Design methodology and development history of an ISO OSI layered architecture for the Canadian Broadcast Telidon system
[CRC-TN-708-E] N82-11337
Microcomputer-controlled communication network for Sandia National Laboratories' environmental test chambers
[DE81-030988] N82-11355

COMMUNITIES
Modeling energy-conservation potentials of community energy-system technologies
[DE81-026059] N82-11589

COMPACTING
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220

COMPARISON
Correlation of shock-initiation tests for explosives and propellants
[DE81-026533] N82-11264
Instrument intercomparisons at the Boulder Atmospheric Observatory during 1980
[PB81-220139] N82-11740
Comparisons of some large scientific computers
[NASA-TM-81928] N82-11817

COMPILERS
COBOL Compiler: Mohawk data sciences MDS COBOL release 12 ANSI 74, series 21-models 40, 50, series 21 operating system 2
[PB81-226425] N82-11798
Perkin-Elmer COBOL R06 Perkin-Elmer model 3240 OS/32 REV 05.02
[PB81-223885] N82-11799

COMPLEX COMPOUNDS
Development and optimization of methodologies for analysis of complex hydrocarbon mixtures
[DE81-025875] N82-11114

COMPONENT RELIABILITY
Standard specification for light ladders
[SABS-1304-1980] N82-11277
Heliostat operation at the central receiver test facility (1978 - 1980)
[DE81-031926] N82-11556
Advanced development of electrical-energy-storage components for high reliability applications
[DE81-025384] N82-11591

COMPOSITE MATERIALS
Novel improved PMR polyimides
[NASA-TM-82733] N82-11117
Physical characterization of electronic materials
[AD-A104494] N82-11135
Development of battery separator composites
[NASA-CR-165508] N82-11547

COMPOSITE STRUCTURES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052

COMPOSITION (PROPERTY)
The isotopic composition of the elements carbon, oxygen, neon, magnesium and silicon in the galactic cosmic rays
[NASA-CR-166715] N82-12019

COMPRESSED AIR
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8: Design approaches: UPH
[DE81-030673] N82-11620
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 9: Design approaches: CAES, appendix C. Major mechanical equipment
[DE81-030672] N82-11621

COMPRESSED GAS
Hydride chemical compressor, phase 1
[DE81-030199] N82-11155
One-dimensional magnetohydrodynamic calculations of a hydrogen-gas puff
[UCRL-85867] N82-11940

COMPRESSIBILITY
Stress relaxation of cellular silicone material: 1981
[DE81-030692] N82-11137

COMPRESSIBILITY EFFECTS
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade N82-11024

COMPRESSIBLE FLOW
Numerical simulation of a compressible homogeneous, turbulent shear flow
[NASA-CR-164953] N82-11396

COMPRESSING
Boosting up of neutral beam heating power by slowly rising toroidal field --- compression
[IPPJ-534] N82-11929

COMPRESSION LOADS
The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics
[RAE-LIB-TRANS-2052] N82-11205

COMPRESSION TESTS
Shock compression of beryllium
[DE81-024062] N82-11200

COMPRESSION WAVES
Acta Mechanica Sinica (selected articles)
[AD-A105636] N82-11019
Compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel N82-11021

COMPRESSOR BLADES
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069

COMPRESSOR EFFICIENCY
Testing and optimizing active rotary flux compressors
[DE81-024376] N82-11378
JT8D high pressure compressor performance improvement
[NASA-CR-165531] N82-11467

COMPRESSORS
Hydride chemical compressor, phase 1
[DE81-030199] N82-11155
Testing and optimizing active rotary flux compressors
[DE81-024376] N82-11378
JT8D high pressure compressor performance improvement
[NASA-CR-165531] N82-11467

COMPUTATION
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148
Proposed simplified energy calculation procedure for use in energy conservation standards activities
[DE81-027190] N82-11319
On the computation of barotropic tides in deep estuaries with application to Knight Inlet, British Columbia
[PB81-220147] N82-11754
Distributed computation of fixed points
[AD-A104418] N82-11791
Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres
[NASA-CR-164930] N82-12010

COMPUTATIONAL FLUID DYNAMICS
Acta mechanica sinica
[AD-A105184] N82-11014
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted N82-11015
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
Higher-level simulations of turbulent flows
[NASA-CR-164936] N82-11395

A computer solution to the stationary Navier-Stokes equations in two dimensions with proven convergence
[NASA-TM-81300] N82-11398

COMPUTER COMPONENTS
The Crosstie Random Access Memory (CRAM). Part 1: The concept and initial studies
[AD-A104543] N82-11788

COMPUTER DESIGN
Philosophy of supercomputing
[DE81-028586] N82-11796
Comparisons of some large scientific computers
[NASA-TM-81928] N82-11817

COMPUTER GRAPHICS
Conceptual design of a computer-generated topographic display system to aid mission planning and mission conduct by Army aviators
[AD-A104388] N82-11517
GRAMPS: A graphics language interpreter for real time, interactive, three dimensional picture editing and animation
[DE81-027398] N82-11811
Computer processing of periodic electron micrographs N82-11815
Methods for presentation and display of multivariate data
[NASA-CR-165788] N82-11833

COMPUTER INFORMATION SECURITY
User's guide: Voice and data communications protection
[PB81-221509] N82-11356

COMPUTER PROGRAM INTEGRITY
Analysis of 4&5 data --- program evaluation
[AD-A104249] N82-11804

COMPUTER PROGRAMMING
Two-phase flow in geothermal energy sources
[DE81-029037] N82-11404
Philosophy of supercomputing
[DE81-028586] N82-11796
Thermal algorithms analysis --- programming tasks supporting the development of a thermal model of the Earth's surface
[NASA-CR-166716] N82-11800
OBJ-1: A study in executable algebraic formal specification
[AD-A104468] N82-11803
The effects of the symbology and spatial arrangement of software specifications in a debugging task
[AD-A104541] N82-11806
Condition recognition for a program synthesizer
[AD-A104586] N82-11808
Programming with a relational calculus
[AD-A104650] N82-11809

COMPUTER PROGRAMS
Some observations on a new numerical method for solving Navier-Stokes equations
[NASA-TP-1934] N82-11032
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
Magnetic Field Satellite (Magsat) data processing system specifications
[NASA-CR-166737] N82-11103
Random error propagation analysis in the plume diagnostic code EMABIC
[AD-A104495] N82-11112
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148
Numerical model study of burning and detonation in small PETN-loaded assemblies
[DE81-028594] N82-11162
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program
[AD-A104546] N82-11499
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program
[AD-A104547] N82-11500
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE81-027131] N82-11712
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738
COBOL Compiler: Mohawk data sciences MDS COBOL release 12 ANSI 74, series 21-models 40, 50, series 21 operating system 2
[PB81-226425] N82-11798
Perkin-Elmer COBOL R06 Perkin-Elmer model 3240 OS/32 REV 05.02
[PB81-223885] N82-11799
Analysis of 4&5 data --- program evaluation
[AD-A104249] N82-11804
Software design of a general purpose data acquisition and control executive --- plasma diagnostics
[DE81-026573] N82-11810
RATFIT: A rational equation-of-state fitting program
[DE81-027273] N82-11812
H-O precessor computer code
[DE81-026669] N82-11814
SPAR data set contents --- finite element structural analysis system
[NASA-TM-83181] N82-11816
Digital ultrasonics signal processing: Flaw data post processing use and description
[NASA-CR-161882] N82-11862
Improved calculations of energy deposition from fast neutrons
[DE81-025385] N82-11885
KUGEL: A thermal, hydraulic, fuel performance and gaseous fission product release code for pebble bed reactor core analysis
[DE81-026561] N82-11904
Search for optimal three-dimensional mapping of the solar corona from K-coronameter data
[PB81-222903] N82-12017

COMPUTER STORAGE DEVICES
Automatic multi-banking of memory for microprocessors
[NASA-CASE-NPO-15295-1] N82-11785
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795

COMPUTER SYSTEMS DESIGN
Design and analysis of a multi-backend database system for performance improvement, functionality expansion and capacity growth, part 2
[AD-A104445] N82-11790
A microprocessor development system for the ALTOS series microcomputers
[AD-A104624] N82-11793
Some notes on operating-system principles
[DE81-030675] N82-11818

COMPUTER SYSTEMS PERFORMANCE
Computer performance prediction of a data flow architecture
[AD-A104587] N82-11792
A back-end data management experiment
[AD-A104579] N82-11794

COMPUTER SYSTEMS PROGRAMS
Fidelity optimization of microprocessor system simulations
[AD-A104679] N82-11786
Guide to the data-acquisition software of the Doublet III computer system
[DE81-026616] N82-11813

COMPUTER TECHNIQUES
Mechanical transformation of task heuristics into operational procedures
[AD-A104674] N82-11802
Software design of a general purpose data acquisition and control executive --- plasma diagnostics
[DE81-026573] N82-11810
Some notes on operating-system principles
[DE81-030675] N82-11818
Integrating medical knowledge and clinical data banks: Discovery and representation of causal relationships from a large time-oriented clinical database. The RX project
[PB81-227233] N82-11987

COMPUTERIZED DESIGN
Computer-aided heat-pump design and optimization
[DE81-024965] N82-11415
Research in nonlinear structural and solid mechanics
[NASA-CP-2147-SUPPL] N82-11489
Condition recognition for a program synthesizer
[AD-A104586] N82-11808
Analytical design for internal burning star grains of solid rockets N82-12025

COMPUTERIZED SIMULATION
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148
One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158
Studies of heat transfer and water migration in soils
[DE81-023951] N82-11425
Computer modeling of an all-secondary explosive hot-wire device
[DE81-030438] N82-11439
Two-dimensional theory and simulation of free electron lasers
[DE81-025365] N82-11461
Solar heat pump simulator
[DE81-024368] N82-11583
Is geothermal simulation a catastrophe?
[DE81-026750] N82-11588
Improved simulation of aerosol, cloud, and density measurements by shuttle lidar
[NASA-CR-3473] N82-11688
Fidelity optimization of microprocessor system simulations
[AD-A104679] N82-11786
Use of a hybrid computer for the flight simulation of a bomb/parachute system
[DE81-025141] N82-11797
Second Image Generation/Display Conference: Closing comments --- flight simulators
[AD-A104676] N82-11807
A simulation analysis of the effectiveness of Markovian control and Bayesian control --- cost analysis
[AD-A104635] N82-11840
Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron
[DE81-025540] N82-11973

COMPUTERS
Philosophy of supercomputing
[DE81-028586] N82-11796
Comparisons of some large scientific computers
[NASA-TM-81928] N82-11817

CONCENTRATION (COMPOSITION)
Speciation of labile and quasi-labile metal complex systems using the Kalman filter
[DE81-025678] N82-11194

CONCENTRATORS
Secondary and compound concentrators for parabolic dish solar thermal power systems
[NASA-CR-164960] N82-11550
Non-solar power tests at the Central Receiver Test Facility (CRTF)
[DE81-026955] N82-11604

CONCENTRIC CYLINDERS
Magnetic bearings
[DE81-024201] N82-11473

CONCRETE STRUCTURES
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program
[AD-A104546] N82-11499
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program
[AD-A104547] N82-11500

Lightweight concrete materials and structural systems for water tanks for thermal storage
[COO-4703-26] N82-11501
CONCRETES
Evaluation of base courses for flexible pavements
[PB81-218372] N82-11329
Lightweight concrete materials and structural systems for water tanks for thermal storage
[COO-4703-26] N82-11501
CONDENSATES
Physics in few dimensions --- condensed matter physics
[DE81-026054] N82-11853
CONFERENCES
Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177
Workshop proceedings: Combustion Turbine Residual Oil
[EPRI-WS-80-132] N82-11261
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691
Workshop on Atomic Physics at the National Synchrotron Light Source
[DE81-023507] N82-11874
CONFIDENCE
Evaluation of uncertainties in geologic information
[DE81-025997] N82-11714
CONFIDENCE LIMITS
Feasible objective confidence bounds for system reliability
[AD-A104260] N82-11483
CONGRESSIONAL REPORTS
Civil servants and contract employees: Who should do what for the Federal Government
[PB81-219966] N82-11979
CONSERVATION LAWS
Upwind difference schemes for hyperbolic systems of conservation laws N82-11820
CONSOLES
NOCA upgrade N82-11304
CONSTITUTIVE EQUATIONS
Constitutive modelling for the shock physicist
[DE81-024063] N82-11854
CONSTRAINTS
Constrained adaptive least mean squared filters
[AD-A104625] N82-11830
CONSTRUCTION
Environmental protection as an ongoing component of large facilities engineering projects N82-11633
CONTAMINANTS
Geothermal environmental assessment: Behavior of selected geothermal brine contaminants in plants and soils
[PB81-222333] N82-11671
Laser induced fluoroescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758
New approaches to quantitating the pulmonary effects on inhaled pollutants
[PB81-222382] N82-11778
CONTINENTAL SHELVES
Plan for technological research and development related to the petroleum activities on the Norwegian Continental Shelf. 1981-1985: Appendixes: 1. Technical challenges. 2. Research requirements. 3. High priority programs
[DE81-904014] N82-11520
Studies of continental and oceanic crust from seismic, geodetic and magnetic observations N82-11685
CONTINUOUS WAVE LASERS
Development of MBE grown Pb-salt semiconductor lasers for the 8.0 to 15.0 micrometer spectral region
[NASA-CR-165683] N82-11453
CONTINUUM MECHANICS
Constitutive modelling for the shock physicist
[DE81-024063] N82-11854
CONTINUUMS
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508
CONTRACT MANAGEMENT
Civil servants and contract employees: Who should do what for the Federal Government
[PB81-219966] N82-11979
CONTROL
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051
Parameter estimation of large flexible aerospace structures with application to the control of the Maypole Deployable Reflector
[NASA-CR-164971] N82-11099
CONTROL BOARDS
Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065
NOCA upgrade N82-11304
CONTROL EQUIPMENT
Management of redundancy in flight control systems using optimal decision theory N82-11084
An evaluation of three-way control single and dual bed catalysts as applied to heavy-duty gasoline engines
[PB81-224982] N82-11477
CONTROL SURFACES
On the kernel function collocation method in steady subsonic flow for wing with control surfaces N82-12023
CONTROL THEORY
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
An introduction to stochasic optimal control theory N82-11076
Mathematical investigation of linear control systems containing input derivatives N82-11819
Partial differential equations from dynamic programming equations N82-11822
A simulation analysis of the effectiveness of Markovian control and Bayesian control --- cost analysis
[AD-A104635] N82-11840
CONTROLLABILITY
Boundary observability and controllability for diffusion equations
[AD-A104293] N82-11829
CONTROLLED FUSION
Stimulated Raman scattering in large plasmas
[DE81-026589] N82-11938
Magnetic fusion energy program, volume 1
[SAI-254-80-656-LJ-VOL-1] N82-11955
Magnetic fusion energy program, volume 2
[SAI-254-80-656-LJ-VOL-2] N82-11956
CONTROLLERS
Development of multivariable controllers for aircraft turbine engines N82-11087
Motor power factor controller with a reduced voltage starter
[NASA-CASE-MFS-25586-1] N82-11360
CONVECTION
A self-consistent linear-mode analysis of a stellar convection zone N82-12008
Compressible convection in a rotating spherical shell --- latitudinal differential rotation on the Sun
[PB81-222895] N82-12018
CONVECTION CURRENTS
A numerical dynamical investigation of the role of subsynoptic inertial an isallobaric adjustments in organizing severe local storm ensembles N82-11719
Numerical simulation of the dynamics, cloud microphysics and radar echo structures of tropical and mid-latitude convection N82-11722
CONVECTIVE FLOW
Test results and analysis of a convective loop solar air collector
[DE81-028151] N82-11599
A self-consistent linear-mode analysis of a stellar convection zone N82-12008
CONVECTIVE HEAT TRANSFER
Investigation of heat transfer in straight and curved rectangular ducts for laminar and transition flows
[AD-A104604] N82-11401
Stefan problem with a convective boundary condition
[DE81-030424] N82-11410
CONVERGENCE
A computer solution to the stationary Navier-Stokes equations in two dimensions with proven convergence
[NASA-TM-81300] N82-11398
CONVERGENT-DIVERGENT NOZZLES
Acta Mechanica Sinica (selected articles)
[AD-A105636] N82-11019
On transonic flow in hyperbolic Laval nozzles --- the conformal curvilinear coordinate method N82-11020
Wind tunnel supplementary Mach number minimum section insert
[NASA-CASE-LAR-12532-1] N82-11088
CONVEYORS
Static continuous electrophoresis device
[NASA-CASE-MFS-25306-1] N82-11147
Rehabilitation of 64-meter-antenna radial bearing N82-11301
COOLERS
Stirling cycle cryogenic cooler --- magnetically suspended pistons
[NASA-CASE-GSC-12697-1] N82-11312
COOLING
Geothermal heat transfer, district heating and cooling
[DE81-023195] N82-11587
Performance testing of the TOLTEC TI-410 concentrating solar collector
[DE81-029994] N82-11617
Theoretical studies of chromospheres and winds in cool stars
[NASA-CR-164969] N82-12004
COOLING SYSTEMS
Energy analysis sample building data
[DE81-027188] N82-11318
Magma Cooling-Tower process pilot-plant demonstration
[DE81-903783] N82-11406
Investigation of direct expansion in ground source heat pumps
[DE81-024139] N82-11418
Well-water-source heat pump field performance study
[DE81-024136] N82-11419
Meteorological Effects of Thermal Energy Releases (METER) program
[DE81-030431] N82-11640
COORDINATES
A two-step approach to finite element ordering
[AD-A104320] N82-11827
COPOLYMERS
Stress relaxation of cellular silicone material: 1981
[DE81-030692] N82-11137
COPPER
Quasi-elastic high-pressure waves in 2024 Al and Cu
[DE81-025334] N82-11971
COPPER ALLOYS
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls
[DE81-029953] N82-11190
COPPER SELENIDES
Advanced selenide thermoelectric development program
[DE81-027823] N82-11562
COPPER SULFIDES
Cadmium sulfide/copper sulfide heterojunction cell research by sputter deposition
[DE81-026219] N82-11553
CORE SAMPLING
An inexpensive, portable vibracoring system for shallow-water and land application
[AD-A104323] N82-11314
CORES
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
CORIOLIS EFFECT
Investigation of spatial disorientation of F-15 Eagle pilots
[AD-A104684] N82-11781
CORONAGRAPHS
Search for optimal three-dimensional mapping of the solar corona from K-coronameter data
[PB81-222903] N82-12017
CORRELATION
Correlation methods
[DE81-025379] N82-11598
CORRELATORS
Binary/analog CCD correlator development
[AD-A104438] N82-11363

CORROSION
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls
[DE81-029953] N82-11190
Deposition and corrosion phenomena on aluminum surfaces under deluged dry cooling-tower conditions
[DE81-025483] N82-11193
CORROSION PREVENTION
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 1 --- underground transmission lines
[DE81-904195] N82-11382
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 2 --- potential gradients and polarization curves
[DE81-904210] N82-11383
CORROSION RESISTANCE
Materials technology for coal-conversion processes
[DE81-028474] N82-11169
Design of refractories for resistance to high-temperature erosion-corrosion
[DE81-904208] N82-11217
CORROSION TESTS
Materials considerations relative to multibarrier waste isolation
[DE81-029104] N82-11894
COSMIC RAYS
The isotopic composition of the elements carbon, oxygen, neon, magnesium and silicon in the galactic cosmic rays
[NASA-CR-166715] N82-12019
A review and interpretation of recent cosmic ray beryllium isotope measurements
[NASA-CR-164967] N82-12020
COSMOLOGY
The Bogoliubov transformation and its application to cosmological particle production N82-12009
COSMONAUTS
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097
COST ANALYSIS
Parametric sensitivity study for solar-assisted heat-pump systems
[DE81-030309] N82-11407
Second generation heliostat, volume 1
[DE81-029618] N82-11564
A simulation analysis of the effectiveness of Markovian control and Bayesian control --- cost analysis
[AD-A104635] N82-11840
Comparison of costs for solidification of high-level radioactive waste solutions: Glass monoliths vs. metal matrices
[ANL-80-121] N82-11890
Civil servants and contract employees: Who should do what for the Federal Government
[PB81-219966] N82-11979
National coal-market conditions for the year 2000: Regional-issue identification and analysis, high scenario
[DE81-026425] N82-11988
COST EFFECTIVENESS
Determining the training effectiveness and cost-effectiveness of visual flight simulators for military aircraft
[AD-A104627] N82-11091
COST ESTIMATES
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566
Study of photovoltaic cost elements. Volume 3: Sandia National Laboratories photovoltaic systems design catalog
[DE81-030986] N82-11567
Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568
Study of photovoltaic cost elements. Volume 5: Installation cost model for intermediate PV systems: Users manual
[DE81-030981] N82-11569
COST REDUCTION
FAA misses opportunities to discontinue or reduce operating hours of some airport traffic control towers
[PB81-224214] N82-11049
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
COULOMB COLLISIONS
Role of excited states of molecular ions in structure studies with high-energy collisions
[DE81-023898] N82-11881
COUPLING
Imperfect magnetosphere-ionosphere coupling and discrete auroras
[AD-A104509] N82-11699
COWLINGS
Low speed testing of the inlets designed for a tamden-fan V/STOL nacelle --- conducted in the Lewis 10 by 10 foot wind tunnel
[NASA-TM-82728] N82-11042
CRACK PROPAGATION
Flaw growth of 7075, 7475, 7050 and 7049 aluminum alloy plate in stress corrosion environments: 4-year marine atmosphere results
[NASA-CR-161887] N82-11181
Fracture mechanics of cellular glass
[NASA-CR-164959] N82-11209
Strength behaviour of fatigue cracked lugs --- stress intensity and crack propagation characteristics
[RAE-LIB-TRANS-2057] N82-11486
Estimating the statistical properties of crack growth for small cracks
[AD-A104672] N82-11496
Electrochemical conditions within stress corrosion cracks (experimental techniques)
[AD-A104246] N82-11497
CRACKING (FRACTURING)
Crack arrest properties of a 9 percent nickel cryogenic steels
[PB81-227993] N82-11202
Fatigue initiation at a high or low number of cycles
[RAE-LIB-TRANS-2056] N82-11487
CRACKS
Eddy current flows around cracks in thin plates for nondestructive testing
[AD-A104407] N82-11481
CROSS FLOW
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391
CROSS POLARIZATION
SMMR data set development for GARP --- impact of cross polarization and Faraday rotation on SMMR derived brightness temperatures
[NASA-CR-166721] N82-11512
CROSSED FIELD GUNS
Trajectory analysis of the electrons in a magnetron-type gun
[DE81-027860] N82-11905
CRUDE OIL
Petroleum geology and resource assessment of the middle Caspian Basin, USSR, with special emphasis on the Uzen field
[DE81-029951] N82-11518
US energy strategies: Some options for eliminating oil imports by the year 2000
[PB81-226052] N82-11626
CRUSTAL FRACTURES
A review of an attempt to create shatter cones with magnetic flyer plate technology
[NASA-CR-164614] N82-11492
Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas --- Texas and Northern Chihuahua, Mexico
[NASA-CR-164964] N82-11695
CRYOGENIC COOLING
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
Stirling cycle cryogenic cooler --- magnetically suspended pistons
[NASA-CASE-GSC-12697-1] N82-11312
CRYOGENIC EQUIPMENT
Cryogenic filters for RFI protection N82-11293
Traveling-wave maser, closed cycle refrigerator automation N82-11294
Low temperature latching solenoid
[NASA-CASE-MSC-18106-1] N82-11357
CRYOGENIC WIND TUNNELS
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
CRYOGENICS
Crack arrest properties of a 9 percent nickel cryogenic steels
[PB81-227993] N82-11202
CRYSTAL DEFECTS
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
Impurity effects in a-Si:H solar cells
[DE81-025069] N82-11575
CRYSTAL DISLOCATIONS
Dislocation induced noises in semiconductors at low and high temperatures
[AD-A104449] N82-11960
CRYSTAL GROWTH
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE81-025587] N82-11577
Growth of silicon sheets from metallurgical-grade silicon
[DE81-025703] N82-11605
Growth of solid solution single crystals --- mercury cadmium tellurides
[NASA-CR-161891] N82-11958
CRYSTAL LATTICES
A structural study of aluminosilicate glasses by Raman spectroscopy N82-11138
Effects of ionizing radiation on the chemical structure, crystalline content and molecular weight distribution of various Teflon resins N82-11203
Theoretical and experimental studies of the electro-optic effect: Toward a microscopic understanding
[AD-A104363] N82-11961
Negative-U for point defects in silicon
[AD-A104482] N82-11966
CRYSTAL OSCILLATORS
Low temperature quartz crystal oscillator fast warm-up saw oscillator
[AD-A104403] N82-11366
CRYSTAL STRUCTURE
Epitaxial morphologies and deposition energetics of polyoxymethylene N82-11204
Vibrational spectra and atom-atom potentials in the crystalline state. 1: A comparison of hexasulfur, octasulfur and dodecasulfur. 2: A study of solid allene N82-11957
CRYSTALLIZATION
Aluminum recovery from fly ash and shale-retort wastes
[DE81-027675] N82-11154
Growth of silicon sheets from metallurgical-grade silicon
[DE81-025703] N82-11605
CRYSTALLOGRAPHY
Determination of exact orientation relationships between martensite and austenite in steels by microdiffraction
[LBL-12289] N82-11195
CUFFS
Logic-controlled occlusive cuff system
[NASA-CASE-MSC-14836-1] N82-11770
CURING
The stability of new transparent polymeric materials: The epoxy trimethoxyboroxine system. Part 1: The preparation, characterization and curing of epoxy resins and their copolymers
[NASA-CR-164951] N82-11208
Mechanism of Monuron-accelerated dicyandiamide cure of epoxy resins
[AD-A104658] N82-11213
CURRENT DENSITY
Symmetries of the nonlinear conductivity for a relativistic turbulent plasma
[AD-A104544] N82-11931
CURRENT REGULATORS
Motor power factor controller with a reduced voltage starter
[NASA-CASE-MFS-25586-1] N82-11360
CURRENT SHEETS
Antenna-plasma coupling theory for ICRF heating of large Tokamaks
[DE81-029815] N82-11933
CURVE FITTING
Modal analysis using a Fourier analyzer, curve-fitting, and modal tuning
[NASA-CR-161886] N82-11490

CUSHIONS
Stress relaxation of cellular silicone material: 1981
[DE81-030692] N82-11137
CUSPS (MATHEMATICS)
Characters of rank two hyperbolic Lie algebras as functions at quasiregular cusps N82-11821
CYANAMIDES
Mechanism of Monuron-accelerated dicyandiamide cure of epoxy resins
[AD-A104658] N82-11213
CYCLONES
An assessment of detecting mesoscale rainfall from mid-latitude cyclones using GOES imagery data
[AD-A104377] N82-11726
CYCLOTRON RADIATION
Theory of electron cyclotron heating in the Constance 2 experiment
[DE81-028269] N82-11906
CYLINDRICAL BODIES
Surface-tension induced instabilities: Effects of lateral boundaries
[NASA-CR-165530] N82-11390
Magnetic bearings
[DE81-024201] N82-11473
CYLINDRICAL CHAMBERS
Standard specification for air-brake reservoirs
[SABS-1312-1980] N82-11464

D

DAMAGE ASSESSMENT
The effects of jet exhaust blast impingements on graphite-epoxy composites --- F-18 aircraft
[AD-A104622] N82-11136
Determination of pulsed CO2 laser damage thresholds of optical surfaces
[AD-A104424] N82-11456
DAMPING
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
DATA ACQUISITION
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438
Software design of a general purpose data acquisition and control executive --- plasma diagnostics
[DE81-026573] N82-11810
Guide to the data-acquisition software of the Doublet III computer system
[DE81-026616] N82-11813
DATA BASE MANAGEMENT SYSTEMS
Design and analysis of a multi-backend database system for performance improvement, functionality expansion and capacity growth, part 2
[AD-A104445] N82-11790
A back-end data management experiment
[AD-A104579] N82-11794
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795
FGDIS primer: Major equipment/component classifications, problem/solution access codes, and definitions related to FGD systems as contained in the Flue Gas Desulfurization Information System (FGDIS)
[PB81-225948] N82-11985
DATA BASES
Atmospheric fluidized-bed projects technology overview
[DE81-027143] N82-11251
International comparison of residential energy use: Indicators of residential energy use and efficiency. Part 1: The data base
[DE81-028550] N82-11592
Data base specifications for the OPAQUE program
[AD-A104340] N82-11709
Design and analysis of a multi-backend database system for performance improvement, functionality expansion and capacity growth, part 2
[AD-A104445] N82-11790
Integrating medical knowledge and clinical data banks: Discovery and representation of causal relationships from a large time-oriented clinical database. The RX project
[PB81-227233] N82-11987
DATA COLLECTION PLATFORMS
Data collection and processing for the ACES --- annual cycle energy system demonstration house
[DE81-030630] N82-11555
DATA MANAGEMENT
Design and analysis of a multi-backend database system for performance improvement, functionality expansion and capacity growth, part 2
[AD-A104445] N82-11790
A back-end data management experiment
[AD-A104579] N82-11794
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795
SPAR data set contents --- finite element structural analysis system
[NASA-TM-83181] N82-11816
DATA PROCESSING
Magnetic Field Satellite (Magsat) data processing system specifications
[NASA-CR-166737] N82-11103
Goldstone (GDSCC) administrative computing N82-11306
The use of DMSP digital data for auroral measurements
[AD-A104392] N82-11707
Software design of a general purpose data acquisition and control executive --- plasma diagnostics
[DE81-026573] N82-11810
SPAR data set contents --- finite element structural analysis system
[NASA-TM-83181] N82-11816
Use of microprocessors in a neutrino experiment
[DE81-026057] N82-11875
DATA REDUCTION
Numerical differentiation of noisy data
[AD-A104631] N82-11831
DATA RETRIEVAL
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795
Content representation for retrieval
[PB81-170672] N82-11984
DATA SMOOTHING
Random error propagation analysis in the plume diagnostic code EMABIC
[AD-A104495] N82-11112
DATA STORAGE
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795
DATA SYSTEMS
Integrating medical knowledge and clinical data banks: Discovery and representation of causal relationships from a large time-oriented clinical database. The RX project
[PB81-227233] N82-11987
DATA TRANSMISSION
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064
Strategies for weather-dependent data acquisition N82-11286
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438
Remote Medical Diagnosis System RMDS design review meeting minutes
[AD-A104555] N82-11772
DECAY RATES
Decay heat curve evaluation test
[DE81-027181] N82-11976
DECISION MAKING
Management of redundancy in flight control systems using optimal decision theory N82-11084
User needs for solar decision-making tools: The homebuilding industry
[DE81-027293] N82-11325
Mechanical transformation of task heuristics into operational procedures
[AD-A104674] N82-11802
A simulation analysis of the effectiveness of Markovian control and Bayesian control --- cost analysis
[AD-A104635] N82-11840
DECISION THEORY
Mechanical transformation of task heuristics into operational procedures
[AD-A104674] N82-11802
DECOMPOSITION
Development of inverse Raman spectroscopy for probing rapidly decomposing explosives and propellants
[AD-A104382] N82-11226
DEEP SPACE
The deep space optical channel. 2: Wave propagation effects N82-11288
RFI channels, 2 N82-11290
The R sub 0 parameter for the Gaussian channel N82-11291
Traveling-wave maser, closed cycle refrigerator automation N82-11294
DEEP SPACE NETWORK
The Telecommunications and Data Acquisition report
[NASA-CR-164939] N82-11279
Radio astronomy N82-11280
A dedicated 26-m SETI sky survey instrument facility: A feasibility study N82-11281
DSN ground communication facility N82-11282
Networks consolidation program N82-11283
DSN model for use in strategic planning N82-11284
Pioneers 6 through 12 mission support N82-11285
Cryogenic filters for RFI protection N82-11293
Digital SAR processing using a fast polynomial transform N82-11295
Minimizing the time to troubleshoot a failed system N82-11296
The quality assurance role in the Deep Space Network N82-11302
Networks consolidation program: Maintenance and Operations (M&O) staffing estimates N82-11303
Relocation of the Deep Space Network Maintenance Center N82-11305
Goldstone (GDSCC) administrative computing N82-11306
Special activity utilization of GDSCC antennas during 1980 N82-11307
An optimization model for energy generation and distribution in a dynamic facility N82-11310
DEFECTS
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
DEFENSE PROGRAM
Where are we in the space war?
[NASA-TM-76604] N82-11096
DEFLAGRATION
Deflagration-to-Detonation Transition (DDT) project
[DE81-030979] N82-11241
DEFLECTORS
The use of remote active deflectors for feeding UHF relay stations
[BBC-RD-1981/5] N82-11334
DEFORMATION
Fatigue initiation at a high or low number of cycles
[RAE-LIB-TRANS-2056] N82-11487
DEGRADATION
The effects of jet exhaust blast impingements on graphite-epoxy composites --- F-18 aircraft
[AD-A104622] N82-11136
DEHYDRATION
Development of a small-scale commercial alcohol dehydration 190 to 200 proof
[DE81-030158] N82-11235
DEICERS
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Ice protection system technology N82-11060
DEIONIZATION
On electron beam ionization of air and chemical reactions for disturbed air deionization
[AD-A104517] N82-11871
DEMAND (ECONOMICS)
Electric power supply and demand for the contiguous United States, 1981 - 1990
[DE81-027126] N82-11376
National coal-market conditions for the year 2000: Regional-issue identification and analysis, high scenario
[DE81-026425] N82-11988
DENDRITIC CRYSTALS
The quantitative determination of non-metallic inclusions by a mathematical statistical method
[RAE-LIB-TRANS-2066] N82-11179

DENSE PLASMAS
Heating of a dense plasma with an intense relativistic electron beam: Initial observations
[DE81-025348] N82-11945
DENSITY (MASS/VOLUME)
Semiconductor measurement technology: The relationship between resistivity and dopant density for phosphorus and boron doped silicon
[PB81-221327] N82-11975
DENSITY DISTRIBUTION
Optical transparency of inexpensive salt solutions for construction of density-gradient ponds
[DE81-030832] N82-11559
DENSITY MEASUREMENT
Improved simulation of aerosol, cloud, and density measurements by shuttle lidar
[NASA-CR-3473] N82-11688
DEPENDENT VARIABLES
The determination of navigational and meteorological variables measured by NOAA/RFC WP3D aircraft
[PB81-225468] N82-11743
DEPLETION
Cyclic nucleotides in tissues during long-term hypokinesia
[NASA-TM-76726] N82-11757
DEPOSITION
Deposition and corrosion phenomena on aluminum surfaces under deluged dry cooling-tower conditions
[DE81-025483] N82-11193
A method for using aerial photos in delineating historic patterns of beach accretion and retreat
[PB81-223836] N82-11536
DESICCANTS
Analysis of solar desiccant systems and concepts
[DE81-023027] N82-11612
DESIGN ANALYSIS
Novel design of pressure vessels and thermal shields in coal gasifiers
[DE81-025828] N82-11474
Second generation heliostat, volume 1
[DE81-029618] N82-11564
Attached sunspace design analysis
[DE81-028738] N82-11601
Molecular-beam system for the study of transient combustion processes
[DE81-030663] N82-11872
DESORPTION
Ocean thermal energy conversion gas-desorption studies. Volume 2: Deaeration in a packed column and a barometric intake system
[DE81-030469] N82-11619
DESULFURIZING
Coal desulfurization by low temperature chlorinolysis, phase 3
[NASA-CR-164957] N82-11145
Laboratory study for removal of organic sulfur from coal
[DE81-025132] N82-11239
Sulfur pollution control. Phase 1: The disposal program
[PB81-222612] N82-11652
EPA utility FGD (Flue Gas Desulfurization) survey
[PB81-225773] N82-11679
FGDIS primer: Major equipment/component classifications, problem/solution access codes, and definitions related to FGD systems as contained in the Flue Gas Desulfurization Information System (FGDIS)
[PB81-225948] N82-11985
DETECTION
Optoacoustic spectroscopy to detect hydrazine fuels
[AD-A104675] N82-11229
Dynamic Moire methods for detection of loosened space shuttle tiles
[NASA-TM-83205] N82-11434
A ground-motion displacement gauge
[AD-A104325] N82-11437
Detection of vibrations in metallic structures using small passive magnetic fields
[AD-A104405] N82-11495
Coal mine hazard detection using synthetic pulse radar
[PB81-224412] N82-11538
DETONATION
Deflagration-to-Detonation Transition (DDT) project
[DE81-030979] N82-11241
DETONATORS
AC firing ability of detonation
[PB81-216053] N82-11272
Computer modeling of an all-secondary explosive hot-wire device
[DE81-030438] N82-11439
DEUTERIUM
Trapping and surface permeation of deuterium in Fe, Ni and stainless steel: An ion-beam study
[DE81-023303] N82-11201
Tritium induced X-ray emission from glass shell inertial fusion targets
[DE81-025599] N82-11936
Trapping and release of implanted D/H ions in fused silica
[DE81-024441] N82-11974
DEVELOPING NATIONS
Urban ecosystem and resource-conserving urbanism in Third World cities
[DE81-029854] N82-11995
DF LASERS
Pulsed DF laser effects study
[AD-A104575] N82-11457
DIAGNOSIS
Remote Medical Diagnosis System RMDS design review meeting minutes
[AD-A104555] N82-11772
Prediction, diagnosis, and causal thinking in forecasting
[AD-A104372] N82-11843
DIAPHRAGMS (MECHANICS)
Diaphragm Stirling engine heat-actuated heat pump development
[DE81-024076] N82-11423
DIELECTRIC PROPERTIES
R&D services to develop an improved isolation technology radiation hardened bipolar integrated circuits (PEDIC)
[AD-A104657] N82-11367
DIELECTRICS
Testing of a spacecraft model in a combined environment simulator
[NASA-TM-82723] N82-11106
Electron attachment as a probe of photoionization processes in liquid media --- pyrene
[DE81-026352] N82-11163
Elastomer unistructure insulators
[DE81-024366] N82-11219
DIESEL ENGINES
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068
Informational report on the measurement and characterization of diesel exhaust emissions
[PB81-221251] N82-11175
Evaluation of exhaust emissions data for diesel engines used in underround mines
[PB81-225377] N82-11673
DIESEL FUELS
Outgassing of two synthetic fuels
[AD-A104580] N82-11231
Transportation fuels from synthetic gas
[DE81-029614] N82-11258
DIFFERENCE EQUATIONS
Difference method in fluid dynamics. 1. Numerical solution of two dimensional vorticity equation
N82-12022
DIFFERENTIAL CALCULUS
Numerical differentiation of noisy data
[AD-A104631] N82-11831
DIFFERENTIAL EQUATIONS
Nonclassical orthogonal polynomials and differential equations N82-11823
DIFFRACTION PATTERNS
Automation of electron diffraction analysis in an analytical electron microscope
[DE81-027255] N82-11159
Determination of exact orientation relationships between martensite and austenite in steels by microdiffraction
[LBL-12289] N82-11195
DIFFUSION COEFFICIENT
Activity and diffusion of metals in binary aluminum alloys
[DE81-025535] N82-11199
DIGITAL COMPUTERS
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072
DIGITAL DATA
The use of DMSP digital data for auroral measurements
[AD-A104392] N82-11707
DIGITAL FILTERS
Recovery of seismic signals in noise by adaptive processing
[DE81-029469] N82-11713
Constrained adaptive least mean squared filters
[AD-A104625] N82-11830
DIGITAL SYSTEMS
Practical design and realization of a digital adaptive flight control system N82-11079
Control law design for transport aircraft flight tasks N82-11080
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083
DIGITAL TECHNIQUES
Digital control of machine tools
[DE81-029950] N82-11476
DIGITAL TRANSDUCERS
Digital ultrasonics signal processing: Flaw data post processing use and description
[NASA-CR-161882] N82-11862
DIODES
Scalability of light ion beams to reach fusion conditions
[DE81-024443] N82-11953
DIPHENYL COMPOUNDS
Physical studies of aromatic methylenes N82-11113
DIPOLE ANTENNAS
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336
DIPOLE MOMENTS
An electrostatic model for energies of molecules in solution N82-11869
DIRECTIONAL ANTENNAS
Rehabilitation of 64-meter-antenna radial bearing N82-11301
Special activity utilization of GDSCC antennas during 1980 N82-11307
DISORIENTATION
Investigation of spatial disorientation of F-15 Eagle pilots
[AD-A104684] N82-11781
DISPLACEMENT
Dynamic Moire methods for detection of loosened space shuttle tiles
[NASA-TM-83205] N82-11434
DISPLAY DEVICES
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064
Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065
NOCA upgrade N82-11304
Second Image Generation/Display Conference: Closing comments --- flight simulators
[AD-A104676] N82-11807
DISSOLVED GASES
Identification of geopressured occurrences outside of the Gulf Coast
[DE81-025511] N82-11522
DISTILLATION
Development of a small-scale commercial alcohol dehydration 190 to 200 proof
[DE81-030158] N82-11235
DISTRIBUTION MOMENTS
Estimation problems associated with the Weibull distribution
[DE81-030466] N82-11841
DISTRICT OF COLUMBIA
Adaptation of land use to surficial geology in metropolitan Washington, D.C. N82-11718
DIURNAL VARIATIONS
Variations in atmospheric angular momentum
[NASA-CR-166712] N82-11690
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165781] N82-11723
Some analysis on the diurnal variation of rainfall over the Atlantic Ocean
[NASA-CR-164937] N82-11724
DOMESTIC ENERGY
US energy strategies: Some options for eliminating oil imports by the year 2000
[PB81-226052] N82-11626

DOPED CRYSTALS
Semiconductor measurement technology: The relationship between resistivity and dopant density for phosphorus and boron doped silicon
[PB81-221327] N82-11975
DOPPLER RADAR
Doppler radar data analysis during fiscal year 1980
[PB81-225476] N82-11742
DRAG
Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing
[AD-A104562] N82-11402
DRAG REDUCTION
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016
DRAINAGE
Ground-water hydrology of the Dade City area, Pasco County, Florida, with emphasis on the hydrologic effects of pumping from the Foridian aquifer
[PB81-225518] N82-11529
DRIFT RATE
Removal of drift from frequency stability measurements N82-11298
DROPS (LIQUIDS)
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
DRUMS (CONTAINERS)
Materials considerations relative to multibarrier waste isolation
[DE81-029104] N82-11894
DUCT GEOMETRY
Investigation of heat transfer in straight and curved rectangular ducts for laminar and transition flows
[AD-A104604] N82-11401
Analyses of ductile flow and fracture in two dimensions
[DE81-023651] N82-11506
DUCTILITY
Failure analysis of a tool steel torque shaft
[NASA-TM-82758] N82-11184
DUCTS
Investigation of heat transfer in straight and curved rectangular ducts for laminar and transition flows
[AD-A104604] N82-11401
DYES
Method for retarding dye fading during archival storage of developed color photographic film --- inert atmosphere
[NASA-CASE-MFS-23250-1] N82-11432
DYNAMIC CHARACTERISTICS
Finite element analysis of the split Hopkinson bar
[DE81-030387] N82-11503
DYNAMIC CONTROL
An introduction to stochasic optimal control theory N82-11076
System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861
DYNAMIC LOADS
Dynamic fracture in viscoelastic solids
[AD-A104687] N82-11494
DYNAMIC MODELS
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
DYNAMIC PROGRAMMING
Partial differential equations from dynamic programming equations N82-11822
DYNAMIC RESPONSE
Nonparametric identification of a class of nonlinear close-coupled dynamic systems
[NASA-CR-164948] N82-11098
Shock compression of beryllium
[DE81-024062] N82-11200
Dynamic measurement of Poisson's ratio in granular materials at 0.2 to 0.8 GPa
[DE81-027559] N82-11504
DYNAMIC TESTS
Advanced superposition methods for high speed turbopump vibration analysis
[NASA-CR-165379] N82-11465

E

EAR
Mechanical impedance of the human outer ear
[RAE-LIB-TRANS-2065] N82-11767
EARTH (PLANET)
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691
EARTH ALBEDO
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165781] N82-11723
EARTH ATMOSPHERE
Variations in atmospheric angular momentum
[NASA-CR-166712] N82-11690
EARTH CORE
Monte Carlo calculations of the melting point of iron at core pressures N82-11681
EARTH CRUST
COCORP traverses in Wyoming and Oklahoma N82-11684
Studies of continental and oceanic crust from seismic, geodetic and magnetic observations N82-11685
Local earthquake travel times and spatial variations of crustal velocity in southern California N82-11687
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691
Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas --- Texas and Northern Chihuahua, Mexico
[NASA-CR-164964] N82-11695
EARTH LIMB
Application of visible monochromatic auroral imaging data for modeling infrared Earth-limb morphology
[AD-A104343] N82-11706
EARTH MANTLE
Hotspots, polar wander, Mesozoic convection and the geoid
[NASA-CR-164943] N82-11694
EARTH MOVEMENTS
The piezomagnetic effect: Limits on detectability using a combined vector and scalar magnetometer array N82-11430
A ground-motion displacement gauge
[AD-A104325] N82-11437
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE81-027131] N82-11712
EARTH PLANETARY STRUCTURE
Studies of continental and oceanic crust from seismic, geodetic and magnetic observations N82-11685
Hotspots, polar wander, Mesozoic convection and the geoid
[NASA-CR-164943] N82-11694
Study of the time evolution of the lithosphere
[NASA-CR-164968] N82-11696
EARTH ROTATION
Variations in atmospheric angular momentum
[NASA-CR-166712] N82-11690
EARTH SURFACE
A new method for measuring the acoustic impedance of the ground N82-11856
EARTHQUAKE RESISTANCE
Seismic resistance characteristics of reinforced concrete beam-supported floor slabs in building structures: Contribution of floor systems to earthquake resistance of building structural frames
[PB81-219172] N82-11326
Racking tests of non-structural building partitions (The behavior of architectural (nonstructural) building components during earthquakes)
[PB81-220790] N82-11328
EARTHQUAKES
The quantitative recognition and evaluation of seismic quiescence: Applications to earthquake prediction and subduction zone tectonics N82-11682
Local earthquake travel times and spatial variations of crustal velocity in southern California N82-11687
Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas --- Texas and Northern Chihuahua, Mexico
[NASA-CR-164964] N82-11695
ECHO SOUNDING
Pulsed-echo interface wave characterization of bolted plates N82-11126
ECLIPSING BINARY STARS
M-alpha emission from a disk in the close binary U Cephei: A Monte Carlo simulation N82-12001
ECONOMIC ANALYSIS
Algorithm for computing in-situ combustion oil recovery performance
[DE81-030340] N82-11153
Technical and economic aspects of hydrogen storage in metal hydrides
[NASA-TM-76610] N82-11223
Conceptual design for a multi-user medium BTU coal gasification complex. Volume 1: Executive summary
[DE81-027139] N82-11238
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities
[DE81-025518] N82-11240
Assessment of oil-shale technology in Brazil
[DE81-027574] N82-11249
Alcohol fuels in the United States
[DE81-026013] N82-11265
Second generation heliostat, volume 1
[DE81-029618] N82-11564
ECONOMIC IMPACT
Near-term goals for alcohol fuels from biomass: An overview of resource requirements, land use, environmental, and socioeconomic impacts --- ethyl alcohol production
[DE81-029987] N82-11245
ECONOMY
Interrelationships of energy and the economy: A supplement to the National Energy Policy Plan required by Title VIII of the US Department of Energy Organization Act (Public Law 95-91)
[DE81-027526] N82-11613
ECOSYSTEMS
Urban ecosystem and resource-conserving urbanism in Third World cities
[DE81-029854] N82-11995
EDDY CURRENTS
High-voltage air-core pulse transformers
[DE81-030999] N82-11370
Eddy current flows around cracks in thin plates for nondestructive testing
[AD-A104407] N82-11481
Finite element analysis of coupled magneto-mechanical problems of conducting plates
[AD-A104406] N82-11851
EDDY VISCOSITY
Higher-level simulations of turbulent flows
[NASA-CR-164936] N82-11395
EDGE LOADING
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
EFFECTIVE PERCEIVED NOISE LEVELS
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860
ELASTIC BENDING
An improved transverse shear deformation theory for laminated antisotropic plates
[NASA-TP-1903] N82-11488
ELASTIC PROPERTIES
Engineering approach for elastic-plastic fracture analysis
[DE81-904218] N82-11502
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508
ELASTIC SCATTERING
Use of microprocessors in a neutrino experiment
[DE81-026057] N82-11875
Elastic and inelastic psi production by muons
[DE81-025326] N82-11877
ELASTIC WAVES
DC calibration of the strain sensitivity of a single mode optical fiber interferometer N82-11124
The 4-day temperature wave in the winter polar stratosphere N82-11720
ELASTOMERS
Elastomer unistructure insulators
[DE81-024366] N82-11219
Dynamic fracture in viscoelastic solids
[AD-A104687] N82-11494
ELECTRIC BATTERIES
Overview of the applied battery and electrochemical research program
[DE81-027397] N82-11594
ELECTRIC CONDUCTORS
Conductor fatigue-life research
[DE81-904209] N82-11369

Advanced selenide thermoelectric development program
[DE81-027823] N82-11562

ELECTRIC CONTACTS
Thermal and chemical effects in high pressure rolling/sliding contacts
[AD-A104473] N82-11471
A study of metal-semiconductor contacts on indium phosphide
[AD-A104439] N82-11965

ELECTRIC CURRENT
Computer modeling of an all-secondary explosive hot-wire device
[DE81-030438] N82-11439

ELECTRIC DISCHARGES
Voltage gradients in solar array cavities as possible breakdown sites in spacecraft-charging-induced discharges
[NASA-TM-82710] N82-11107

ELECTRIC ENERGY STORAGE
Advanced development of electrical-energy-storage components for high reliability applications
[DE81-025384] N82-11591

ELECTRIC FIELDS
Electromagnetic field mapping of cylinder and missile nosecone
[AD-A104312] N82-11104
Particle trajectories in a model electric field 1 --- neutralizing spacecraft surfaces
[AD-A104507] N82-11870

ELECTRIC GENERATORS
Preliminary evaluation of advanced coal-based electricity-generating technologies by means of system-integration analysis
[DE81-029989] N82-11573
Considerations for the design, implementation, and effective operation of Sandia's super-power generators
[DE81-025404] N82-11908

ELECTRIC NETWORKS
Concept for a power system controller for large space electrical power systems
[NASA-TP-1939] N82-11109

ELECTRIC POTENTIAL
Elastomer unistructure insulators
[DE81-024366] N82-11219

ELECTRIC POWER PLANTS
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities
[DE81-025518] N82-11240
Possible use of coal in Hawaii, 1980 - 2000
[DE81-028266] N82-11263
Vibration signature analysis and acoustic-emission monitoring at Brayton Point
[DE81-904232] N82-11507
Meteorological Effects of Thermal Energy Releases (METER) program
[DE81-030431] N82-11640

ELECTRIC POWER SUPPLIES
Electric power supply and demand for the contiguous United States, 1981 - 1990
[DE81-027126] N82-11376

ELECTRIC POWER TRANSMISSION
Project demonstration of wind-turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE81-030950] N82-11380

ELECTRIC PROPULSION
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems. Volume 1: Executive summary
[NASA-CR-165502-VOL-1] N82-11110
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems, volume 2
[NASA-CR-165502-VOL-2] N82-11111
Lithium/iron sulfide cell development for electric-vehicle propulsion
[DE81-023570] N82-11996

ELECTRIC WIRE
Investigation of the strength of shielded and unshielded underwater electrical cables
[AD-A104314] N82-11364
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 1 --- underground transmission lines
[DE81-904195] N82-11382
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 2 --- potential gradients and polarization curves
[DE81-904210] N82-11383

ELECTRICAL FAULTS
Acoustic waveguide technique for sensing incipient faults in underground power-transmission cables: Including acousto-optic techniques
[DE81-029626] N82-11381

ELECTRICAL INSULATION
Elastomer unistructure insulators
[DE81-024366] N82-11219
Investigation of the strength of shielded and unshielded underwater electrical cables
[AD-A104314] N82-11364
Low temperature growth and electrical characterization of insulators for GaAs MISFETS
[NASA-CR-164972] N82-11959

ELECTRICAL MEASUREMENT
The piezomagnetic effect: Limits on detectability using a combined vector and scalar magnetometer array N82-11430
Electrical conductivity structure of the San Andreas fault in central California N82-11686

ELECTRICAL RESISTIVITY
Certain physical properties of cobalt and nickel borides
[NASA-TM-76623] N82-11185
Surface resistivity measurements of candidate subreflector surfaces N82-11300
Scattering of electromagnetic waves by obstacles in the presence of the Earth's surface
[AD-A104242] N82-11342
The effects of impurities on the performance of silicon solar cells
[NASA-CR-164945] N82-11548
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027234] N82-11557
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027254] N82-11558
Electrical conductivity structure of the San Andreas fault in central California N82-11686
Symmetries of the nonlinear conductivity for a relativistic turbulent plasma
[AD-A104544] N82-11931
Negative-U for point defects in silicon
[AD-A104482] N82-11966
Semiconductor measurement technology: The relationship between resistivity and dopant density for phosphorus and boron doped silicon
[PB81-221327] N82-11975

ELECTRICITY
Engineering challenges of fusion-reactor development
[DE81-024129] N82-11907

ELECTRO-OPTICS
Physical characterization of electronic materials
[AD-A104494] N82-11135
Submicron-particle absorption spectroscopy by photothermal modulation of MIE scattered light
[DE81-025096] N82-11160
Theoretical and experimental studies of the electro-optic effect: Toward a microscopic understanding
[AD-A104363] N82-11961

ELECTROACOUSTIC TRANSDUCERS
A comparison of weighting techniques for SAW transducers at UHF
[AD-A104510] N82-11362

ELECTROACOUSTIC WAVES
Pulsed-echo interface wave characterization of bolted plates N82-11126

ELECTROCATALYSTS
Survey on aging on electrodes and electrocatalysts in phosphoric acid fuel cells
[NASA-CR-165505] N82-11545
Oxygen reduction on carbon-supported platinum fuel-cell electrodes in H sub 3 Po sub 4
[DE81-027303] N82-11582

ELECTROCHEMICAL CELLS
Calcium/metal sulfide battery development program
[ANL-81-14] N82-11578
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607

ELECTROCHEMICAL MACHINING
Tooling for electrochemical deburring
[DE81-030190] N82-11475

ELECTROCHEMISTRY
Speciation of labile and quasi-labile metal complex systems using the Kalman filter
[DE81-025678] N82-11194
Investigation of the zinc electrode reaction --- nickel zinc batteries
[DE81-030221] N82-11368
Electrochemical conditions within stress corrosion cracks (experimental techniques)
[AD-A104246] N82-11497
Overview of the applied battery and electrochemical research program
[DE81-027397] N82-11594

ELECTRODES
Investigation of the zinc electrode reaction --- nickel zinc batteries
[DE81-030221] N82-11368
Survey on aging on electrodes and electrocatalysts in phosphoric acid fuel cells
[NASA-CR-165505] N82-11545

ELECTRODYNAMICS
Tooling for electrochemical deburring
[DE81-030190] N82-11475

ELECTROLYSIS
Review of thermally regenerative electrochemical systems, volume 2
[DE81-029624] N82-11572

ELECTROLYTES
The volumes and heat capacities of nonelectrolytes and organic electrolytes in methanol at 25 C N82-11142

ELECTROLYTIC CELLS
Investigation of Lithium Sulfur Dioxide (Li/SO2) battery safety hazard
[AD-A104326] N82-11552
Review of thermally regenerative electrochemical systems, volume 2
[DE81-029624] N82-11572
Recent advances in lead-acid cell research and development
[DE81-023104] N82-11580
Lithium/iron sulfide cell development for electric-vehicle propulsion
[DE81-023570] N82-11996

ELECTROMAGNETIC NOISE
Recovery of seismic signals in noise by adaptive processing
[DE81-029469] N82-11713

ELECTROMAGNETIC PULSES
System safety program plan --- electromagnetic pulse testing of the A-7E aircraft
[AD-A104557] N82-11354

ELECTROMAGNETIC RADIATION
Goldstone high power radiation control N82-11308
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 1: Investigation of resonance extraction procedures --- for target recognition
[AD-A104530] N82-11350
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 2: Appendices --- for target recognition
[AD-A104531] N82-11351
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 3: Translation of Prony's method --- for target recognition
[AD-A104532] N82-11352

ELECTROMAGNETIC SCATTERING
Scattering of electromagnetic waves by obstacles in the presence of the Earth's surface
[AD-A104242] N82-11342
Electromagnetic scattering by targets over a real Earth
[AD-A104492] N82-11347

ELECTROMAGNETISM
Finite element analysis of coupled magneto-mechanical problems of conducting plates
[AD-A104406] N82-11851

ELECTROMOTIVE FORCES
Certain physical properties of cobalt and nickel borides
[NASA-TM-76623] N82-11185
Activity and diffusion of metals in binary aluminum alloys
[DE81-025535] N82-11199

ELECTRON ACCELERATORS
Brookhaven National Laboratory Tandem accelerator upgrading program
[DE81-025093] N82-11897
ELECTRON ATTACHMENT
Electron attachment as a probe of photoionization processes in liquid media --- pyrene
[DE81-026352] N82-11163
ELECTRON BEAMS
Two-dimensional theory and simulation of free electron lasers
[DE81-025365] N82-11461
On electron beam ionization of air and chemical reactions for disturbed air deionization
[AD-A104517] N82-11871
Trajectory analysis of the electrons in a magnetron-type gun
[DE81-027860] N82-11905
ELECTRON BOMBARDMENT
Testing of a spacecraft model in a combined environment simulator
[NASA-TM-82723] N82-11106
ELECTRON COUNTERS
High latitude electron detectors on Satellite P78-1: Preliminary data results
[AD-A104518] N82-11701
ELECTRON DENSITY (CONCENTRATION)
High latitude electron detectors on Satellite P78-1: Preliminary data results
[AD-A104518] N82-11701
Search for optimal three-dimensional mapping of the solar corona from K-coronameter data
[PB81-222903] N82-12017
ELECTRON DIFFRACTION
Automation of electron diffraction analysis in an analytical electron microscope
[DE81-027255] N82-11159
ELECTRON ENERGY
Investigation of direct solar-to-microwave energy conversion techniques
[NASA-CR-161883] N82-11544
Electron-temperature requiremernts for neutralized inertial-confinement-fusion light-ion beams
[DE81-025352] N82-11884
Oblique propagation of electron thermal modes below the electron plasma frequency without boundary effects
[IPPJ-533] N82-11928
ELECTRON GUNS
Trajectory analysis of the electrons in a magnetron-type gun
[DE81-027860] N82-11905
ELECTRON MICROSCOPES
Automation of electron diffraction analysis in an analytical electron microscope
[DE81-027255] N82-11159
ELECTRON MICROSCOPY
Experiments in high voltage electron microscopy --- radiation damage in ceramics and alloys
[DE81-025574] N82-11375
Computer processing of periodic electron micrographs N82-11815
ELECTRON PARAMAGNETIC RESONANCE
Non-linear evolution of an obliquely propagating Langmuir wave N82-11385
ELECTRON PRECIPITATION
Two variable modelling of equatorward boundary of auroral precipitation
[AD-A104378] N82-11708
ELECTRON RADIATION
Radiation testing of composite materials, in situ versus ex situ effects
[NASA-CR-3475] N82-11116
ELECTRON SPIN
H-O precessor computer code
[DE81-026669] N82-11814
ELECTRON STATES
The hydrogen atom in a strong uniform magnetic field N82-11866
Laser excitation of surface electronic states for a one-dimensional semiconductor
[AD-A104522] N82-11964
ELECTRON TRAJECTORIES
Trajectory analysis of the electrons in a magnetron-type gun
[DE81-027860] N82-11905
ELECTRON TRANSITIONS
Physical studies of aromatic methylenes N82-11113
ELECTRONIC EQUIPMENT
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566
Study of photovoltaic cost elements. Volume 3: Sandia National Laboratories photovoltaic systems design catalog
[DE81-030986] N82-11567
Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568
ELECTRONIC EQUIPMENT TESTS
Engineering Analysis System (EASY)
[DE81-027508] N82-11846
ELECTRONIC TRANSDUCERS
Outsider's look at flight instrumentation
[DE81-025409] N82-11066
ELECTRONS
Negative-U for point defects in silicon
[AD-A104482] N82-11966
ELECTROPHORESIS
Static continuous electrophoresis device
[NASA-CASE-MFS-25306-1] N82-11147
ELECTROPLATING
Activation of superalloys and stainless steels for chromium plating
[AD-A104313] N82-11188
ELECTROSTATIC PRECIPITATORS
Small conductive particle sensor --- microfiber size determination
[NASA-CASE-LAR-12552-1] N82-11431
ELECTROSTATIC WAVES
Oblique propagation of electron thermal modes below the electron plasma frequency without boundary effects
[IPPJ-533] N82-11928
ELECTROSTATICS
An electrostatic model for energies of molecules in solution N82-11869
EMBRITTLEMENT
Liquid and solid metal embrittlement
[AD-A103048] N82-11187
EMERGENCY LIFE SUSTAINING SYSTEMS
Recommended guidelines for oxygen self-rescuers. Volume 1: Underground coal mining
[PB81-225872] N82-11782
Recommended guidelines for oxygen self-rescuers. Volume 2: Appendices
[PB81-225880] N82-11783
EMISSION
Observations of molecular clouds containing reflection nebulae N82-11999
EMISSION SPECTRA
X-ray and gamma-ray observations of pulsed emission from radio pulsars N82-12000
M-alpha emission from a disk in the close binary U Cephei: A Monte Carlo simulation N82-12001
EMISSIVITY
An analysis of cloud property retrieval using infrared sounder data
[PB81-221608] N82-11732
EMPLOYEE RELATIONS
Applying science and technology to improve local government productivity
[PB81-217986] N82-11978
ENERGY ABSORPTION FILMS
National photovoltaic program in amorphous materials
[DE81-025906] N82-11609
ENERGY BUDGETS
Sampling design for the 1980 commercial and multifamily residential building survey
[DE81-028783] N82-11320
Energy analysis for a sample building by the proposed ASHRAE simplified method
[DE81-027189] N82-11323
ENERGY CONSERVATION
Proposed simplified energy calculation procedure for use in energy conservation standards activities
[DE81-027190] N82-11319
Assessment of roofing research
[DE81-027077] N82-11322
EPA evaluation of the FUEL-MAX device under Section 511 of the Motor Vehicle Information and Cost Savings Act
[PB81-229856] N82-11479
EPA evaluation of the Automotive Cylinder Deactivator System (ACDS) under Section 511 of the Motor Vehicle Information and Cost Saving Act
[PB81-228256] N82-11480
Energy programs at the John Hopkins University Applied Physics Laboratory
[PB81-218141] N82-11535
Modeling energy-conservation potentials of community energy-system technologies
[DE81-026059] N82-11589
SOLPLAN report: An assessment of barriers and incentives to conservation and alternative-energy use in the residential sector in Wisconsin
[DOE/CS-30292/3] N82-11614
Third automotive fuel economy research contractors coordination meeting
[PB81-222754] N82-11627
ENERGY CONSUMPTION
Site And Neighborhood Design (SAND): Development of simplified automated building thermal load procedures, phase 1
[DE81-027138] N82-11317
Assessment of building diagnostics
[DE81-027078] N82-11321
Energy analysis for a sample building by the proposed ASHRAE simplified method
[DE81-027189] N82-11323
Well-water-source heat pump field performance study
[DE81-024136] N82-11419
International comparison of residential energy use: Indicators of residential energy use and efficiency. Part 1: The data base
[DE81-028550] N82-11592
Long-term performance of the Hunn passive solar residence
[DE81-028735] N82-11600
ENERGY CONVERSION
Analysis of thermal/mechanical energy-conversion concepts
[DE81-027854] N82-11585
Residual-energy-applications program: EAST-facility requirements document
[DE81-027489] N82-11616
Site selection for small wind energy conversion systems for US Department of Energy field evaluation program
[PB81-226862] N82-11624
ENERGY CONVERSION EFFICIENCY
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027234] N82-11557
Use of solar thermal energy to generate electricity
[DE81-028797] N82-11606
ENERGY DISSIPATION
Energy losses in conductors carrying very high currents
[DE81-025367] N82-11373
Laboratory determination of frosting and defrosting losses for a high efficiency air-source heat pump
[DE81-023218] N82-11416
ENERGY LEVELS
Elastic and inelastic psi production by muons
[DE81-025326] N82-11877
ENERGY POLICY
Vertical combustor for refuse combustion
[DE81-030002] N82-11152
Algorithm for computing in-situ combustion oil recovery performance
[DE81-030340] N82-11153
Investigation of mechanisms of hydrogen transfer in coal hydrogenation
[DE81-030492] N82-11165
Laboratory study for removal of organic sulfur from coal
[DE81-025132] N82-11239
Near-term goals for alcohol fuels from biomass: An overview of resource requirements, land use, environmental, and socioeconomic impacts --- ethyl alcohol production
[DE81-029987] N82-11245
Assessment of oil-shale technology in Brazil
[DE81-027574] N82-11249
Atmospheric fluidized-bed projects technology overview
[DE81-027143] N82-11251
Advanced-gasification processes
[DE81-030184] N82-11254
Transportation fuels from synthetic gas
[DE81-029614] N82-11258

Hydrogen storage-bed design for tritium systems test assembly
[DE81-025336] N82-11262
Possible use of coal in Hawaii, 1980 - 2000
[DE81-026266] N82-11263
Alcohol fuels in the United States
[DE81-026013] N82-11265
LLNL underground coal gasification project
[DE81-030634] N82-11267
Environmental research plan for gas supply technologies. Volume 2: Environmental research plan
[PB81-222317] N82-11274
Ethanol production in southern tier east region of New York: Technical and economic feasibility
[PB81-226979] N82-11275
Synthetic fuel development for the Upper Missouri River Basin. Section 13: Water assessment report
[PB81-224537] N82-11276
Low-cost solar flat-plate-collector development
[DE81-025081] N82-11584
Modeling energy-conservation potentials of community energy-system technologies
[DE81-026059] N82-11589
Interrelationships of energy and the economy: A supplement to the National Energy Policy Plan required by Title VIII of the US Department of Energy Organization Act (Public Law 95-91)
[DE81-027526] N82-11613
SOLPLAN report: An assessment of barriers and incentives to conservation and alternative-energy use in the residential sector in Wisconsin
[DOE/CS-30292/3] N82-11614
An assessment of selected solar energy industry activities
[PB81-222424] N82-11623
Site selection for small wind energy conversion systems for US Department of Energy field evaluation program
[PB81-226862] N82-11624
The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute
[PB81-226813] N82-11625
US energy strategies: Some options for eliminating oil imports by the year 2000
[PB81-226052] N82-11626
Environmental research plan for gas supply technologies. Volume 1: Executive summary
[PB81-222309] N82-11657

ENERGY REQUIREMENTS
An optimization model for energy generation and distribution in a dynamic facility N82-11310
Uncertainties associated with inertial-fusion ignition
[DE81-025408] N82-11944

ENERGY SOURCES
Gas recovery from coal deposits
[PB81-222291] N82-11271
Thermal and electrochemical biomass conversion at SERI
[DE81-030507] N82-11563

ENERGY SPECTRA
Decay heat curve evaluation test
[DE81-027181] N82-11976

ENERGY STORAGE
Hydrogen storage-bed design for tritium systems test assembly
[DE81-025336] N82-11262
Energy programs at the John Hopkins University Applied Physics Laboratory
[PB81-218141] N82-11535
Data collection and processing for the ACES --- annual cycle energy system demonstration house
[DE81-030630] N82-11555
Recent advances in lead-acid cell research and development
[DE81-023104] N82-11580
Mechanical Energy Storage Technology (MEST) development
[DE81-026800] N82-11596
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8: Design approaches: UPH
[DE81-030673] N82-11620
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 9: Design approaches: CAES, appendix C. Major mechanical equipment
[DE81-030672] N82-11621
Assessment of flywheel system benefits in selected vehicle applications
[DE81-025976] N82-11997

ENERGY TECHNOLOGY
Yawing of wind turbines with blade cyclic pitch variation
[DE81-030091] N82-11045
Transport characteristics of alternate slurry fuels
[DE81-028580] N82-11255
Chemical heat pump program: An overview
[DE81-025086] N82-11414
Energy programs at the John Hopkins University Applied Physics Laboratory
[PB81-218141] N82-11535
Heat storage duration
[DE81-026635] N82-11602
An assessment of selected solar energy industry activities
[PB81-222424] N82-11623
Intergrated assessment for energy-related environmental standards: A summary of issues and findings
[DE81-028552] N82-11646

ENGINE CONTROL
Space shuttle main engine controller
[NASA-TP-1932] N82-11784

ENGINE DESIGN
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068
Development of multivariable controllers for aircraft turbine engines N82-11087
Integrated analysis of engine
[NASA-TM-82713] N82-11491

ENGINE INLETS
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043

ENGINE TESTS
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089

ENGINEERING MANAGEMENT
Goldstone (GDSCC) administrative computing N82-11306

ENTHALPY
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170
High-temperature enthalpy and X-ray powder diffraction data for aluminum sulfide (Al2S)
[PB81-226250] N82-11174

ENTRAINMENT
Performance limits of gravity-assist heat pipes with simple wick structures
[LA-UR-81-969] N82-11427

ENTROPY
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170

ENVIRONMENT EFFECTS
Near-term goals for alcohol fuels from biomass: An overview of resource requirements, land use, environmental, and socioeconomic impacts --- ethyl alcohol production
[DE81-029987] N82-11245
Assessment of oil-shale technology in Brazil
[DE81-027574] N82-11249
Advanced-gasification processes
[DE81-030184] N82-11254
Environmental research plan for gas supply technologies. Volume 2: Environmental research plan
[PB81-222317] N82-11274
Plan for technological research and development related to the petroleum activities on the Norwegian Continental Shelf. 1981-1985: Appendixes: 1. Technical challenges. 2. Research requirements. 3. High priority programs
[DE81-904014] N82-11520
Raft River geothermal project groundwater monitoring program
[DE81-030202] N82-11521
Great Plains gasification project, Mercer County, North Dakota; water assessment report section 13(c)
[PB81-216111] N82-11524
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525
Solid and hazardous energy wastes: Synfuels. 1: Review of research activities
[DE81-028503] N82-11644
OTEC environmental biological oceanographic program
[DE81-027402] N82-11645
Sulfur pollution control. Phase 2: The impact of stack gas cleanup on the sulfur mining industry of Texas and Louisiana
[PB81-222820] N82-11653
Assessment of hazard potential from combustion of wastes in industrial boilers
[PB81-221889] N82-11656
Environmental research plan for gas supply technologies. Volume 1: Executive summary
[PB81-222309] N82-11657
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE81-027131] N82-11712
Geothermal environmental assessment baseline study: Vegetation and soils of the Roosevelt Hot Springs geothermal resource area
[PB81-223299] N82-11717
National coal-market conditions for the year 2000: Regional-issue identification and analysis, high scenario
[DE81-026425] N82-11988

ENVIRONMENT POLLUTION
Geochemical controls on trace metal transport in aqueous environmental systems N82-11631
The planning and management of California's coastal resources
[PB81-224057] N82-11670

ENVIRONMENT PROTECTION
A proposed new policy for planetary protection
[NASA-CR-164947] N82-11095
Environmental protection as an ongoing component of large facilities engineering projects N82-11633
Intergrated assessment for energy-related environmental standards: A summary of issues and findings
[DE81-028552] N82-11646

ENVIRONMENTAL CHEMISTRY
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 1, phase 2
[AD-A104552] N82-11484
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 2, phase 2
[AD-A104553] N82-11485

ENVIRONMENTAL MONITORING
Coal gasifier parameters influencing environmental pollutant production
[PB81-221301] N82-11273
Vibration signature analysis and acoustic-emission monitoring at Brayton Point
[DE81-904232] N82-11507
Environmental Monitoring Report, Sandia National Labs., Albuquerque, New Mexico, 180
[DE81-027839] N82-11649
Technical activities of the Office of Environmental Measurements - 1980
[PB81-227860] N82-11677

ENVIRONMENTAL SURVEYS
Solvent-Refined Coal-1 Demonstration Project. Final environmental impact statement, Volume 1 of 2 --- coal liquefaction plant at Newman, Kentucky
[DE81-025983] N82-11252

ENVIRONMENTAL TESTS
Flaw growth of 7075, 7475, 7050 and 7049 aluminum alloy plate in stress corrosion environments: 4-year marine atmosphere results
[NASA-CR-161887] N82-11181

EPITAXY
Epitaxial morphologies and deposition energetics of polyoxymethylene N82-11204

EPOXY RESINS
The stability of new transparent polymeric materials: The epoxy trimethoxyboroxine system. Part 1: The preparation, characterization and curing of epoxy resins and their copolymers
[NASA-CR-164951] N82-11208
Mechanism of Monuron-accelerated dicyandiamide cure of epoxy resins
[AD-A104658] N82-11213

EQUATIONS OF STATE
Deflagration-to-Detonation Transition (DDT) project
[DE81-030979] N82-11241
Performance of a 100-kV, 78kJ electric-gun system
[DE81-025603] N82-11374
EQUATORIAL ATMOSPHERE
Two variable modelling of equatorward boundary of auroral precipitation
[AD-A104378] N82-11708
ALTAIR radar study of equatorial spread F
[AD-A104554] N82-11710
EQUILIBRIUM EQUATIONS
A two-step approach to finite element ordering
[AD-A104320] N82-11827
EQUIPMENT SPECIFICATIONS
Standard specification for industrial safety-belt assemblies
[SABS-809-1980] N82-11278
Standard specification for apparatus for gamma radiography
[SABS-1317-1980] N82-11433
Standard specification for air-brake reservoirs
[SABS-1312-1980] N82-11464
Equipment for flood and flash flood warning systems
[PB81-224131] N82-11749
EROSION
Design of refractories for resistance to high-temperature erosion-corrosion
[DE81-904208] N82-11217
A method for using aerial photos in delineating historic patterns of beach accretion and retreat
[PB81-223836] N82-11536
ERROR ANALYSIS
Random error propagation analysis in the plume diagnostic code EMABIC
[AD-A104495] N82-11112
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165781] N82-11723
ERROR DETECTION CODES
Symbol error rate performance evaluation of the LM37 multimegabit telemetry modulator-demodulator unit N82-11289
On-line failure detection of vibrating structures
[UCRL-86099] N82-11505
ERRORS
Estimation of radar range biases at multiple sites
[AD-A104306] N82-11346
ESTIMATES
An error budget for the JPL hydrogen maser receiver N82-11297
Removal of drift from frequency stability measurements N82-11298
ESTIMATING
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738
Generalized L-, M- and R-statistics
[AD-A104480] N82-11835
A note on a nonparametric maximum penalized likelihood estimator of the probability density function of a positive random variable. AMPLE with positive support
[AD-A104476] N82-11836
Estimation problems associated with the Weibull distribution
[DE81-030466] N82-11841
ESTUARIES
On the computation of barotropic tides in deep estuaries with application to Knight Inlet, British Columbia
[PB81-220147] N82-11754
Time dependent mixing in a salt wedge estuary N82-11755
ETHERS
Use of polyethers in the treatment of acidic high-activity nuclear wastes
[DE81-027087] N82-11895
ETHYL ALCOHOL
Near-term goals for alcohol fuels from biomass: An overview of resource requirements, land use, environmental, and socioeconomic impacts --- ethyl alcohol production
[DE81-029987] N82-11245
Ethanol production in southern tier east region of New York: Technical and economic feasibility
[PB81-226979] N82-11275
ETHYLENE
Reaction of oxygen atoms with ethylene and vinylbromide
[DE81-025206] N82-11879
EUCLIDEAN GEOMETRY
Special functions and harmonic analysis on P sub n N82-11824
EUROPE
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637
EVALUATION
Analysis of 4&5 data --- program evaluation
[AD-A104249] N82-11804
EVAPORATION RATE
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
EVAPORATIVE COOLING
Magma Cooling-Tower process pilot-plant demonstration
[DE81-903783] N82-11406
Meteorological Effects of Thermal Energy Releases (METER) program
[DE81-030431] N82-11640
EVAPOTRANSPIRATION
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734
EVOLUTION (DEVELOPMENT)
Studies of continental and oceanic crust from seismic, geodetic and magnetic observations N82-11685
EXCIMER LASERS
Direct observation of excited oxygen atom production and deactivation N82-11868
EXCITATION
Laser excitation of surface electronic states for a one-dimensional semiconductor
[AD-A104522] N82-11964
EXHAUST EMISSION
Informational report on the measurement and characterization of diesel exhaust emissions
[PB81-221251] N82-11175
Low-Btu-gasifier emissions toxicology
[DE81-031000] N82-11651
Sulfur pollution control. Phase 2: The impact of stack gas cleanup on the sulfur mining industry of Texas and Louisiana
[PB81-222820] N82-11653
Evaluation of exhaust emissions data for diesel engines used in underround mines
[PB81-225377] N82-11673
FGDIS primer: Major equipment/component classifications, problem/solution access codes, and definitions related to FGD systems as contained in the Flue Gas Desulfurization Information System (FGDIS)
[PB81-225948] N82-11985
Evaluation of the micro-carburetor
[NASA-CR-164958] N82-11994
EXHAUST GASES
Liquid-liquid chromatography fractionation of organic compounds in complex mixtures: Application to automobile exhaust
[DE81-030743] N82-11650
EPA utility FGD (Flue Gas Desulfurization) survey
[PB81-225773] N82-11679
Selected studies of four high-temperature air-pollution sources N82-11680
EXISTENCE THEOREMS
Recursive aspects of the theory of real closed fields N82-11849
EXPANSION
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
EXPERIMENTAL DESIGN
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen N82-11026
LLNL underground coal gasification project
[DE81-030634] N82-11267
EXPLODING WIRES
AC firing ability of detonation
[PB81-216053] N82-11272
Computer modeling of an all-secondary explosive hot-wire device
[DE81-030438] N82-11439
EXPLORATION
Exploration of coal and anthracitic carbonaceous shale resources, Narragansett Basin, Massachusetts, and Rhode Island
[DE81-030895] N82-11523
EXPLOSIVE FORMING
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220
EXPLOSIVES
Shock-induced organic chemistry
[DE81-024442] N82-11115
Numerical model study of burning and detonation in small PETN-loaded assemblies
[DE81-028594] N82-11162
Development of inverse Raman spectroscopy for probing rapidly decomposing explosives and propellants
[AD-A104382] N82-11226
Correlation of shock-initiation tests for explosives and propellants
[DE81-026533] N82-11264
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
EXPOSURE
Carbon/graphite fibers: Environmental exposures and potential health implications
[PB81-229692] N82-11780
EXTRATERRESTRIAL RESOURCES
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989

F

F-18 AIRCRAFT
The effects of jet exhaust blast impingements on graphite-epoxy composites --- F-18 aircraft
[AD-A104622] N82-11136
FABRICATION
Side impact sled and padding development
[PB81-217952] N82-11092
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220
Manufacturing methods and technology engineering for tape chip carrier
[AD-A104393] N82-11365
Heat-pipe development for high-temperature recuperator application
[LA-UR-81-1414] N82-11428
Lasers in materials processing
[DE81-027657] N82-11460
Solar cell development for the power extension package
[NASA-TM-82685] N82-11551
Low-cost solar flat-plate-collector development
[DE81-025081] N82-11584
Advanced development of electrical-energy-storage components for high reliability applications
[DE81-025384] N82-11591
Design and fabrication of quadrupole ion mass spectrometer for upper atmosphere
[AD-A104319] N82-11705
The Crosstie Random Access Memory (CRAM). Part 1: The concept and initial studies
[AD-A104543] N82-11788
FAILURE ANALYSIS
Failure analysis of a tool steel torque shaft
[NASA-TM-82758] N82-11184
Traveling-wave maser, closed cycle refrigerator automation N82-11294
Minimizing the time to troubleshoot a failed system N82-11296
Vibration signature analysis and acoustic-emission monitoring at Brayton Point
[DE81-904232] N82-11507
Failure mechanism study of GaAs technology
[AD-A104440] N82-11963

FAILURE MODES
On-line failure detection of vibrating structures [UCRL-86099] N82-11505
Oxide effects on photoemission from high current GaAs photocathodes [DE81-025129] N82-11972
FALLOUT
Environmental Monitoring Report, Sandia National Labs., Albuquerque, New Mexico, 180 [DE81-027839] N82-11649
Industrial process fugitive emissions inventory for the Region V Great Lakes shoreline [PB81-212037] N82-11658
FAR INFRARED RADIATION
Far-infrared measurements of trace gases [NASA-CR-164965] N82-11698
FAR ULTRAVIOLET RADIATION
Testing of a spacecraft model in a combined environment simulator [NASA-TM-82723] N82-11106
FARADAY EFFECT
Magneto-optically modulated CH3OH laser for Faraday rotation measurements in Tokamaks [DE81-027298] N82-11462
SMMR data set development for GARP — impact of cross polarization and Faraday rotation on SMMR derived brightness temperatures [NASA-CR-166721] N82-11512
Plasmaspheric, faraday and total electron contents, 1977 and 1978 [AD-A104362] N82-11700
FAST FOURIER TRANSFORMATIONS
Digital SAR processing using a fast polynomial transform N82-11295
FAST NEUTRONS
Improved calculations of energy deposition from fast neutrons [DE81-025385] N82-11885
FATIGUE (MATERIALS)
Fatigue initiation at a high or low number of cycles [RAE-LIB-TRANS-2056] N82-11487
FATIGUE LIFE
Conductor fatigue-life research [DE81-904209] N82-11369
Strength behaviour of fatigue cracked lugs — stress intensity and crack propagation characteristics [RAE-LIB-TRANS-2057] N82-11486
FEASIBILITY ANALYSIS
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities [DE81-025518] N82-11240
Peat biogasification development program [DE81-028299] N82-11243
Ethanol production in southern tier east region of New York: Technical and economic feasibility [PB81-226979] N82-11275
Comparisons of some large scientific computers [NASA-TM-81928] N82-11817
FEEDBACK CONTROL
Design techniques for mutlivariable flight control systems N82-11078
Practical design and realization of a digital adaptive flight control system N82-11079
FERMENTATION
Cattail rhizome-derived alcohol [DE81-028307] N82-11234
FERMI SURFACES
Electronic structure and many-body effects in Pd [DE81-023110] N82-11970
FERRITES
Microstructure and properties of dual-phase steels containing fine precipitates [DE81-029946] N82-11192
FERROMAGNETIC MATERIALS
Detection of vibrations in metallic structures using small passive magnetic fields [AD-A104405] N82-11495
FIBER COMPOSITES
The industrial processing of unidirectional fiber prepregs [NASA-TM-76599] N82-11119
Detection of acoustic emission in composites by optical fiber interferometry N82-11125
SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board [DE81-903377] N82-11615
FIBER OPTICS
Electronic master monitor and advisory display system, data transmission study [AD-A104243] N82-11064
Optical fiber interferometer for the study of ultrasonic waves in composite materials [NASA-CR-164916] N82-11121
Optical fiber interferometer for the study of ultrasonic waves in composite materials, discussion N82-11122
Detection of ultrasonic waves in solids by an optical fiber interferometer N82-11123
DC calibration of the strain sensitivity of a single mode optical fiber interferometer N82-11124
Detection of acoustic emission in composites by optical fiber interferometry N82-11125
Attenuation of ultrasonic interface waves on metal-polymer-metal boundaries N82-11127
Characterization of metal-polymer boundaries using Stoneley and Leaky waves N82-11128
Optical detection of pulsed surface particle displacements N82-11131
Wideband optical measurements of ultrasonic pulses N82-11132
Dual differential interferometer for measurements of broadband surface acoustic waves N82-11133
Physical characterization of electronic materials [AD-A104494] N82-11135
Local distribution fiber optic cable communication system [AD-A104491] N82-11911
Single mode optical waveguide design investigation [AD-A104584] N82-11913
Improvements to a high-frequency fiber-optic system for plasma diagnostics [DE81-028741] N82-11919
Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers [PB81-224610] N82-11920
FIBER ORIENTATION
The industrial processing of unidirectional fiber prepregs [NASA-TM-76599] N82-11119
FIBER REINFORCED COMPOSITES
Radiation testing of composite materials, in situ versus ex situ effects [NASA-CR-3475] N82-11116
FIELD EFFECT TRANSISTORS
Low noise tuned amplifier [NASA-CASE-GSC-12567-1] N82-11359
Low temperature growth and electrical characterization of insulators for GaAs MISFETS [NASA-CR-164972] N82-11959
Failure mechanism study of GaAs technology [AD-A104440] N82-11963
FIELD STRENGTH
Electromagnetic field mapping of cylinder and missile nosecone [AD-A104312] N82-11104
FIELD THEORY (ALGEBRA)
Recursive aspects of the theory of real closed fields N82-11849
FIELD THEORY (PHYSICS)
Physics in few dimensions — condensed matter physics [DE81-026054] N82-11853
Classical field theory with Z(3) symmetry [DE81-027089] N82-11969
FILLERS
The stability of new transparent polymeric materials: The epoxy trimethoxyboroxine system. Part 1: The preparation, characterization and curing of epoxy resins and their copolymers [NASA-CR-164951] N82-11208
FILTRATION
Techniques for geothermal liquid sampling and analysis [DE81-030151] N82-11149
FINANCIAL MANAGEMENT
Unique characteristics of financing science in the USSR [PB81-212243] N82-11980
FINITE DIFFERENCE THEORY
Some observations on a new numerical method for solving Navier-Stokes equations [NASA-TP-1934] N82-11032
Development of prediction method for transonic shock induced separated flow [AD-A104566] N82-11403
Analyses of ductile flow and fracture in two dimensions [DE81-023651] N82-11506
Upwind difference schemes for hyperbolic systems of conservation laws N82-11820
FINITE ELEMENT METHOD
Electromagnetic scattering by targets over a real Earth [AD-A104492] N82-11347
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations [AD-A104545] N82-11498
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program [AD-A104546] N82-11499
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program [AD-A104547] N82-11500
Finite element analysis of the split Hopkinson bar [DE81-030387] N82-11503
On the computation of barotropic tides in deep estuaries with application to Knight Inlet, British Columbia [PB81-220147] N82-11754
SPAR data set contents — finite element structural analysis system [NASA-TM-83181] N82-11816
A two-step approach to finite element ordering [AD-A104320] N82-11827
Finite element analysis of coupled magneto-mechanical problems of conducting plates [AD-A104406] N82-11851
FIR FILTERS
Constrained adaptive least mean squared filters [AD-A104625] N82-11830
FIRE FIGHTING
Firefighting module development [NASA-TM-82444] N82-11311
FISSION PRODUCTS
KUGEL: A thermal, hydraulic, fuel performance and gaseous fission product release code for pebble bed reactor core analysis [DE81-026561] N82-11904
Decay heat curve evaluation test [DE81-027181] N82-11976
FITTING
RATFIT: A rational equation-of-state fitting program [DE81-027273] N82-11812
FIXED POINTS (MATHEMATICS)
Distributed computation of fixed points [AD-A104418] N82-11791
FLAME PROPAGATION
The effects of gaseous atmospheres on the performance characteristics of aluminum-sodium nitrate flares [AD-A104383] N82-11227
FLAME RETARDANTS
The stability of new transparent polymeric materials: The epoxy trimethoxyboroxine system. Part 1: The preparation, characterization and curing of epoxy resins and their copolymers [NASA-CR-164951] N82-11208
FLAME SPECTROSCOPY
Detection of oil in water by a flame emission technique [PB81-226185] N82-11178
FLAME STABILITY
Research on the recirculating flow rate in the wake of two-dimensional flame stabilizers (under cold conditions) N82-11028
FLAME TEMPERATURE
Soot formation in synfuels [DE81-030273] N82-11164
FLANGES
Clamp-mount device [NASA-CASE-MFS-25510-1] N82-11470
FLAT PLATES
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen N82-11026
Solar energy system performance evaluation: Forest City Dilion, Washington, D.C., January 1980 - December 1980 [DE81-028174] N82-11560

Solar energy system performance evaluation: Montecito Pines, Santa Rosa, California, November 1979 - April 1980
[DE81-028175] N82-11561
Low-cost solar flat-plate-collector development
[DE81-025081] N82-11584

FLEXIBLE BODIES
Parameter estimation of large flexible aerospace structures with application to the control of the Maypole Deployable Reflector
[NASA-CR-164971] N82-11099

FLEXIBLE SPACECRAFT
Control design of flexible spacecraft N82-11081

FLIGHT CHARACTERISTICS
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051

FLIGHT CONDITIONS
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-76617] N82-11725

FLIGHT CONTROL
Flight trajectory control investigation
[AD-A104542] N82-11048
Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065
Design considerations for optimal flight control systems N82-11077
Design techniques for mutivariable flight control systems N82-11078
Practical design and realization of a digital adaptive flight control system N82-11079
Control law design for transport aircraft flight tasks N82-11080
Management of redundancy in flight control systems using optimal decision theory N82-11084

FLIGHT OPTIMIZATION
Optimum climb and descent trajectories for airline missions N82-11082

FLIGHT PATHS
Algorithm for fuel conservative horizontal capture trajectories
[NASA-TM-81334] N82-11018

FLIGHT SIMULATION
Multiple-instruction, multiple-data path computers: Parallel processing impact on flight simulation software
[AD-A104506] N82-11789
Use of a hybrid computer for the flight simulation of a bomb/parachute system
[DE81-025141] N82-11797
Second Image Generation/Display Conference: Closing comments --- flight simulators
[AD-A104676] N82-11807

FLIGHT SIMULATORS
Determining the training effectiveness and cost-effectiveness of visual flight simulators for military aircraft
[AD-A104627] N82-11091

FLIGHT TEST INSTRUMENTS
Outsider's look at flight instrumentation
[DE81-025409] N82-11066

FLIGHT TESTS
Use of a hybrid computer for the flight simulation of a bomb/parachute system
[DE81-025141] N82-11797

FLIGHT TRAINING
Determining the training effectiveness and cost-effectiveness of visual flight simulators for military aircraft
[AD-A104627] N82-11091

FLOOD PREDICTIONS
A systems approach to the real-time runoff analysis with a deterministic rainfall-runoff model
[PB81-224495] N82-11530

FLOODS
Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado
[PB81-224313] N82-11667
Equipment for flood and flash flood warning systems
[PB81-224131] N82-11749

FLOORS
Seismic resistance characteristics of reinforced concrete beam-supported floor slabs in building structures: Contribution of floor systems to earthquake resistance of building structural frames
[PB81-219172] N82-11326

FLORIDA
Ground-water hydrology of the Dade City area, Pasco County, Florida, with emphasis on the hydrologic effects of pumping from the Floridan aquifer
[PB81-225518] N82-11529

FLOW CHARACTERISTICS
Analytical and experimental study of flow phenomena in noncavitating rocket pump inducers
[NASA-CR-3471] N82-11031
Novel improved PMR polyimides
[NASA-TM-82733] N82-11117
One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158
Chemorheology and quality control for an adhesive
[AD-A104556] N82-11215
Acta Mechania Sinica
[AD-A105635] N82-12021
Numerical computation and analysis of the flow field in a large shock tube with a variable cross-sectional area N82-12026

FLOW DIRECTION INDICATORS
Directional flow sensor
[NASA-CASE-FRC-11074-1] N82-11436

FLOW DISTORTION
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

FLOW DISTRIBUTION
Some features of flow past slotted wings
[RAE-LIB-TRANS-2050] N82-11030
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036
A wake source model for non-symmetric flow past bluff bodies in two-dimensional flow
[C-OF-A-MEMO-8109] N82-11037
Generation of axi-symmetric body shapes in subsonic flow by means of polynomial distributions of sources and doublets along the axis of symmetry
[C-OF-A-MEMO-8110] N82-11038
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
Static continuous electrophoresis device
[NASA-CASE-MFS-25306-1] N82-11147

FLOW EQUATIONS
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
A second-order accurate procedure for solving the boundary layer equations based on the predictor-corrector form of the Crank-Nicolson Scheme
[NAL-TR-655] N82-11826

FLOW GEOMETRY
Higher-level simulations of turbulent flows
[NASA-CR-164936] N82-11395
Mean values and an inverse problem for porous media flow
[DE81-027210] N82-11411

FLOW MEASUREMENT
Portable transfer standards for pressure and gas flow measurements
[DE81-024445] N82-11409

FLOW STABILITY
Shear flow instabilities in a rotating system N82-11388

FLOW VELOCITY
Research on the recirculating flow rate in the wake of two-dimensional flame stabilizers (under cold conditions) N82-11028
Wind tunnel supplementary Mach number minimum section insert
[NASA-CASE-LAR-12532-1] N82-11088
Techniques for geothermal liquid sampling and analysis
[DE81-030151] N82-11149
Flow routing in the Susquehanna River Basin: Part 4 - routing reservoir releases in the eastern Susquehanna River Basin in New York State
[PB81-221533] N82-11533
Mechanistic analysis of loft pulsed neutron activation data --- pipe flow velocity
[DE81-027124] N82-11876

FLOW VISUALIZATION
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
Acta Mechania Sinica
[AD-A105635] N82-12021
On the capacity of holographic phase-shift interferometric technique in the visualization of low density flows N82-12024

FLOWMETERS
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063
Calibration of a laminar flowmeter: The data and correlations
[DE81-025227] N82-11441
Calibration of a laminar flowmeter
[DE81-024423] N82-11442

FLUES
EPA utility FGD (Flue Gas Desulfurization) survey
[PB81-225773] N82-11679

FLUID DYNAMICS
Diffusivity of particles moving rapidly through a turbulent fluid
[DE81-030414] N82-11408
Acta Mechania Sinica
[AD-A105635] N82-12021
Difference method in fluid dynamics. 1. Numerical solution of two dimensional vorticity equation N82-12022

FLUIDIZED BED PROCESSORS
Fluidized bed coal combustion reactor
[NASA-CASE-NPO-14273-1] N82-11144
Assessment of advanced coal gasification processes
[NASA-CR-164949] N82-11146
Tennessee Valley Authority atmospheric fluidized-bed combustor simulation
[DE81-030262] N82-11151
Atmospheric fluidized-bed projects technology overview
[DE81-027143] N82-11251
Surface coal gasification
[DE81-030183] N82-11253
Lewis Research Center's coal-fired, pressurized, fluidized-bed reactor test facility
[NASA-TM-81616] N82-11397
Fluid-bed heat-exchanger optimization and bed materials selection
[DOE/ET-11343/T2] N82-11571

FLUORESCENCE
Vibrational sensitization of of 14N14NO, 15N14NO and H2O by laser excited SF6 N82-11143
Laser induced fluoroescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758
Molecular spectroscopy and relaxation in supersonic beams N82-11867

FLUSHING
Effects of planform geometry on tidal flushing and mixing in Marinas
[PB81-219537] N82-11660

FLUTTER
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034

FLUTTER ANALYSIS
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070

FLUX (RATE)
Source-to-incident-flux relation in a Tokamak blanket module
[DE81-026524] N82-11941
Preliminary activation calculations for the poloidal divertor experiment
[DE81-026525] N82-11942

FLUX DENSITY
High energy density capacitor testing for the AFWL SHIVA
[DE81-023688] N82-11379

FLUX QUANTIZATION
Bounded limit for the Monte Carlo point-flux-estimator
[DE81-026526] N82-11883

FLYING PLATFORMS
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
FLYWHEELS
Mechanical Energy Storage Technology (MEST) development
[DE81-026800] N82-11596
Assessment of flywheel system benefits in selected vehicle applications
[DE81-025976] N82-11997
FOAMS
Fracture mechanics of cellular glass
[NASA-CR-164959] N82-11209
FOCUSING
The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute
[PB81-226813] N82-11625
FOG
An open-ocean marine fog development and forecast model for Ocean Weather Station Papa
[AD-A104595] N82-11729
FOLDING STRUCTURES
Technology for large space systems: A special bibliography
[NASA-SP-7046(05)] N82-11093
Standard specification for light ladders
[SABS-1304-1980] N82-11277
Study of foldable elastic tubes for large space structure applications, phase 3
[NASA-CR-164929] N82-11493
FORECASTING
Correlation methods
[DE81-025379] N82-11598
US energy strategies: Some options for eliminating oil imports by the year 2000
[PB81-226052] N82-11626
Prediction, diagnosis, and causal thinking in forecasting
[AD-A104372] N82-11843
FORMALISM
OBJ-1: A study in executable algebraic formal specification
[AD-A104468] N82-11803
Programming with a relational calculus
[AD-A104650] N82-11809
Sensitivity theory for nonlinear systems. 2: Extensions to additional classes of responses
[DE81-030258] N82-11845
FORMAT
The effects of the symbology and spatial arrangement of software specifications in a debugging task
[AD-A104541] N82-11806
FORTRAN
RATFIT: A rational equation-of-state fitting program
[DE81-027273] N82-11812
KUGEL: A thermal, hydraulic, fuel performance and gaseous fission product release code for pebble bed reactor core analysis
[DE81-026561] N82-11904
FOSSIL FUELS
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148
Preliminary evaluation of advanced coal-based electricity-generating technologies by means of system-integration analysis
[DE81-029989] N82-11573
Survey of particulate emission macro- and micro-sampling and sizing methods
[DE81-028348] N82-11642
Solid and hazardous energy wastes: Synfuels. 1: Review of research activities
[DE81-028503] N82-11644
FOUNDATIONS
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Evaluation of base courses for flexible pavements
[PB81-218372] N82-11329
Bearing capacity and characterization of compressible Clayev and Silty Foundation soils in Oklahoma
[PB81-231607] N82-11330
FOURIER ANALYSIS
Fourier analysis of broadband, low-level signals using switched inputs
[AD-A104588] N82-11353
Modal analysis using a Fourier analyzer, curve-fitting, and modal tuning
[NASA-CR-161886] N82-11490
On the computation of barotropic tides in deep estuaries with application to Knight Inlet, British Columbia
[PB81-220147] N82-11754
FOURIER TRANSFORMATION
Surface analysis by Fourier transform infrared (Ftir) spectroscopy
[DE81-025741] N82-11150
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925
FRACTIONATION
Liquid-liquid chromatography fractionation of organic compounds in complex mixtures: Application to automobile exhaust
[DE81-030743] N82-11650
FRACTOGRAPHY
Hydrogen damage in stainless steel
[DP-MS-81-31] N82-11197
FRACTURE MECHANICS
Crack arrest properties of a 9 percent nickel cryogenic steels
[PB81-227993] N82-11202
Fracture mechanics of cellular glass
[NASA-CR-164959] N82-11209
Strength behaviour of fatigue cracked lugs — stress intensity and crack propagation characteristics
[RAE-LIB-TRANS-2057] N82-11486
Analyses of ductile flow and fracture in two dimensions
[DE81-023651] N82-11506
FRACTURE STRENGTH
Crack arrest properties of a 9 percent nickel cryogenic steels
[PB81-227993] N82-11202
Engineering approach for elastic-plastic fracture analysis
[DE81-904218] N82-11502
FRACTURES (MATERIALS)
Engineering approach for elastic-plastic fracture analysis
[DE81-904218] N82-11502
FRACTURING
Dynamic fracture in viscoelastic solids
[AD-A104687] N82-11494
FREE ELECTRON LASERS
Two-dimensional theory and simulation of free electron lasers
[DE81-025365] N82-11461
FREE JETS
Impinging jets
[PB81-227902] N82-11392
FREEZING
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-76617] N82-11725
FREQUENCY STABILITY
An error budget for the JPL hydrogen maser receiver N82-11297
Removal of drift from frequency stability measurements N82-11298
Low temperature quartz crystal oscillator fast warm-up saw oscillator
[AD-A104403] N82-11366
Theoretical analysis of effect of Langmuir flow in ring laser N82-11447
FREQUENCY STANDARDS
An error budget for the JPL hydrogen maser receiver N82-11297
Removal of drift from frequency stability measurements N82-11298
FRESNEL REFLECTORS
Secondary and compound concentrators for parabolic dish solar thermal power systems
[NASA-CR-164960] N82-11550
FRONTS (METEOROLOGY)
Frontogenesis in the planetary boundary layer of an amplifying, two-dimensional baroclinic wave N82-11721
FUEL CELLS
Rechargeable molten-salt cells
[DE81-027091] N82-11595
FUEL COMBUSTION
Atmospheric fluidized-bed projects technology overview
[DE81-027143] N82-11251
Workshop proceedings: Combustion Turbine Residual Oil
[EPRI-WS-80-132] N82-11261
Third automotive fuel economy research contractors coordination meeting
[PB81-222754] N82-11627
Assessment of hazard potential from combustion of wastes in industrial boilers
[PB81-221889] N82-11656
FUEL CONSUMPTION
Algorithm for fuel conservative horizontal capture trajectories
[NASA-TM-81334] N82-11018
EPA evaluation of the FUEL-MAX device under Section 511 of the Motor Vehicle Information and Cost Savings Act
[PB81-229866] N82-11479
EPA evaluation of the Automotive Cylinder Deactivator System (ACDS) under Section 511 of the Motor Vehicle Information and Cost Saving Act
[PB81-228256] N82-11480
Evaluation of the micro-carburetor
[NASA-CR-164958] N82-11994
FUEL FLOW
Transport characteristics of alternate slurry fuels
[DE81-028580] N82-11255
FUEL GAGES
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063
FUEL OILS
Studies for the stabilization of coal-oil mixtures
[DOE/ET-10746/T1] N82-11156
Detection of oil in water by a flame emission technique
[PB81-226185] N82-11178
Workshop proceedings: Combustion Turbine Residual Oil
[EPRI-WS-80-132] N82-11261
FUEL PRODUCTION
Advanced system experimental facility: Solid waste to methane gas. Background and process description
[DE81-030198] N82-11244
Fusion as a source of synthetic fuels
[BNL-29281] N82-11257
Environmental research plan for gas supply technologies. Volume 2: Environmental research plan
[PB81-222317] N82-11274
Engineering challenges of fusion-reactor development
[DE81-024129] N82-11907
FUEL SYSTEMS
Firefighting module development
[NASA-TM-82444] N82-11311
FUELS
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/1] N82-11259
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/2] N82-11260
FUNCTIONAL ANALYSIS
Sensitivity theory for nonlinear systems. 2: Extensions to additional classes of responses
[DE81-030258] N82-11845
FUNCTIONS (MATHEMATICS)
A theoretical and experimental investigation of the photometric functions of particulate surfaces N82-12012
FURLABLE ANTENNAS
Parameter estimation of large flexible aerospace structures with application to the control of the Maypole Deployable Reflector
[NASA-CR-164971] N82-11099
FURNACES
Space processing of electronic materials — determining ther themal conductivity of mercury cadmium tellurides and furnace design
[NASA-CR-161892] N82-11094
FUSES (ORDNANCE)
AC firing ability of detonation
[PB81-216053] N82-11272

The deconvolution of aerosol backscattered optical pulses to obtain system-independent aerosol signatures
[AD-A104578] N82-11914

FUSION REACTORS
Engineering challenges of fusion-reactor development
[DE81-024129] N82-11907
Calculation procedures for the analysis of integral experiments for fusion-reactor design
[DE81-027626] N82-11949

G

GALACTIC RADIATION
The isotopic composition of the elements carbon, oxygen, neon, magnesium and silicon in the galactic cosmic rays
[NASA-CR-166715] N82-12019

GALLIUM ARSENIDE LASERS
InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452

GALLIUM ARSENIDES
Low temperature growth and electrical characterization of insulators for GaAs MISFETS
[NASA-CR-164972] N82-11959
Failure mechanism study of GaAs technology
[AD-A104440] N82-11963
Oxide effects on photoemission from high current GaAs photocathodes
[DE81-025129] N82-11972

GAMMA RAY ASTRONOMY
X-ray and gamma-ray observations of pulsed emission from radio pulsars N82-12000

GAMMA RAY LASERS
Theoretical investigations into possible X-ray and gamma-ray lasers N82-11445

GAMMA RAY SPECTRA
Decay heat curve evaluation test
[DE81-027181] N82-11976

GAMMA RAYS
Standard specification for apparatus for gamma radiography
[SABS-1317-1980] N82-11433
Use of nuclear resonant scattering of Gamma rays for in vivo measurement of iron
[DE81-026051] N82-11775

GANYMEDE
The morphology and evolution of Ganymede and Callisto N82-12013

GAS ANALYSIS
Proof of concept study
[AD-A104338] N82-11639
Stratospheric trace gas composition studies utilizing in situ cryogenic, whole-air sampling methods
[AD-A104375] N82-11689

GAS CHROMATOGRAPHY
Development and optimization of methodologies for analysis of complex hydrocarbon mixtures
[DE81-025875] N82-11114
The use of lanthanide chelates as selective complexing sorbents for gas chromatography N82-11139
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-029125] N82-11166

GAS COMPOSITION
Evaluation of exhaust emissions data for diesel engines used in underround mines
[PB81-225377] N82-11673
Far-infrared measurements of trace gases
[NASA-CR-164965] N82-11698

GAS COOLING
A new method of cooling turbine vanes N82-11027

GAS DENSITY
One-dimensional magnetohydrodynamic calculations of a hydrogen-gas puff
[UCRL-85867] N82-11940

GAS EVOLUTION
Outgassing of two synthetic fuels
[AD-A104580] N82-11231

GAS FLOW
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade N82-11024
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248
Portable transfer standards for pressure and gas flow measurements
[DE81-024445] N82-11409
Directional flow sensor
[NASA-CASE-FRC-11074-1] N82-11436
Theoretical analysis of effect of Langmuir flow in ring laser N82-11447

GAS INJECTION
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248

GAS JETS
Gas-jet laser-plasma interaction experiments
[DE81-027169] N82-11943

GAS LASERS
Analytical description of time characteristics high power laser pulses N82-11449

GAS MASERS
An error budget for the JPL hydrogen maser receiver N82-11297
Removal of drift from frequency stability measurements N82-11298

GAS PRESSURE
Portable transfer standards for pressure and gas flow measurements
[DE81-024445] N82-11409

GAS RECOVERY
Solar coal-gasification reactor for hydrocarbon-free synthesis gas
[DE81-026600] N82-11247
Gas recovery from coal deposits
[PB81-222291] N82-11271
Environmental research plan for gas supply technologies. Volume 1: Executive summary
[PB81-222309] N82-11657

GAS TRANSPORT
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654

GAS TURBINE ENGINES
A new method of cooling turbine vanes N82-11027

GAS TURBINES
Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182
Workshop proceedings: Combustion Turbine Residual Oil
[EPRI-WS-80-132] N82-11261
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654

GAS-METAL INTERACTIONS
Studies of the kinetics and mechanism of gas-surface reactions on metal and metal oxide surfaces N82-11140
Adsorption of hydrogen on iron and the hydrogen embrittlement of steel
[DE81-025164] N82-11196
Hydrogen damage in stainless steel
[DP-MS-81-31] N82-11197

GASIFICATION
Peat biogasification development program
[DE81-028299] N82-11243
Transportation fuels from synthetic gas
[DE81-029614] N82-11258
Environmental research plan for gas supply technologies. Volume 2: Environmental research plan
[PB81-222317] N82-11274
Sulfur pollution control. Phase 1: The disposal program (sections 5 through 7)
[PB81-222804] N82-11655

GASOHOL (FUEL)
Ethanol production in southern tier east region of New York: Technical and economic feasibility
[PB81-226979] N82-11275

GENERAL AVIATION AIRCRAFT
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339

GEOCHEMISTRY
Geochemical controls on trace metal transport in aqueous environmental systems N82-11631
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669

GEOCHRONOLOGY
COCORP traverses in Wyoming and Oklahoma N82-11684
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691

GEODESY
Hotspots, polar wander, Mesozoic convection and the geoid
[NASA-CR-164943] N82-11694
Report on research at AFGL
[AD-A104513] N82-11704
Military geodesy and geospace science, unit three
[AD-A105072] N82-11711

GEOIDS
Hotspots, polar wander, Mesozoic convection and the geoid
[NASA-CR-164943] N82-11694

GEOLOGICAL FAULTS
Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas --- Texas and Northern Chihuahua, Mexico
[NASA-CR-164964] N82-11695

GEOLOGY
Hotspots, polar wander, Mesozoic convection and the geoid
[NASA-CR-164943] N82-11694
Evaluation of uncertainties in geologic information
[DE81-025997] N82-11714
Adaptation of land use to surficial geology in metropolitan Washington, D.C. N82-11718

GEOMAGNETISM
Magnetic Field Satellite (Magsat) data processing system specifications
[NASA-CR-166737] N82-11103
Geomagnetic observations N82-11693

GEOMETRICAL OPTICS
Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers
[PB81-224610] N82-11920

GEOMETRY
Effects of planform geometry on tidal flushing and mixing in Marinas
[PB81-219537] N82-11660

GEOPHYSICS
Report on research at AFGL
[AD-A104513] N82-11704

GEOPRESSURE
Identification of geopressured occurrences outside of the Gulf Coast
[DE81-025511] N82-11522

GEOTECHNICAL ENGINEERING
Plan for technological research and development related to the petroleum activities on the Norwegian Continental Shelf. 1981-1985: Appendixes: 1. Technical challenges. 2. Research requirements. 3. High priority programs
[DE81-904014] N82-11520

GEOTEMPERATURE
Investigation of direct expansion in ground source heat pumps
[DE81-024139] N82-11418

GEOTHERMAL ENERGY CONVERSION
Analysis of thermal/mechanical energy-conversion concepts
[DE81-027854] N82-11585

GEOTHERMAL ENERGY EXTRACTION
Raft River geothermal project groundwater monitoring program
[DE81-030202] N82-11521
Relaxation of geothermal-reservoir stresses induced by heat production
[DE81-032024] N82-11715
Geothermal environmental assessment baseline study: Vegetation and soils of the Roosevelt Hot Springs geothermal resource area
[PB81-223299] N82-11717

GEOTHERMAL ENERGY UTILIZATION
Geothermal heat transfer, district heating and cooling
[DE81-023195] N82-11587

GEOTHERMAL RESOURCES
Techniques for geothermal liquid sampling and analysis
[DE81-030151] N82-11149
Two-phase flow in geothermal energy sources
[DE81-029037] N82-11404
Is geothermal simulation a catastrophe?
[DE81-026750] N82-11588

Geothermal environmental assessment: Behavior of selected geothermal brine contaminants in plants and soils
[PB81-222333] N82-11671

GERT
Methods for presentation and display of multivariate data
[NASA-CR-165788] N82-11833

GIBBS FREE ENERGY
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170

GLACIOLOGY
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532

GLASS
Fracture mechanics of cellular glass
[NASA-CR-164959] N82-11209
Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics
[DE81-030423] N82-11218
Determination of pulsed CO2 laser damage thresholds of optical surfaces
[AD-A104424] N82-11456

GLASS FIBER REINFORCED PLASTICS
Fabrication and wear test of a continuous fiber/particulate composite total surface hip replacement
[NASA-TM-81746] N82-11211

GLOBAL ATMOSPHERIC RESEARCH PROGRAM
SMMR data set development for GARP --- impact of cross polarization and Faraday rotation on SMMR derived brightness temperatures
[NASA-CR-166721] N82-11512

GLOBAL POSITIONING SYSTEM
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339

GOALS
Information of mission and functions of the National Bureau of Standards
[PB81-228207] N82-11761

GOVERNMENT PROCUREMENT
Civil servants and contract employees: Who should do what for the Federal Government
[PB81-219966] N82-11979

GRADIENTS
Optical transparency of inexpensive salt solutions for construction of density-gradient ponds
[DE81-030832] N82-11559
The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739

GRAIN BOUNDARIES
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
Thin-film polycrystaline silicon solar cells: Progress and problems
[DE81-025704] N82-11608
Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron
[DE81-025540] N82-11973

GRAND TOURS
Virtual center arraying N82-11287

GRANULAR MATERIALS
Dynamic measurement of Poisson's ratio in granular materials at 0.2 to 0.8 GPa
[DE81-027559] N82-11504

GRAPHITE
Novel improved PMR polyimides
[NASA-TM-82733] N82-11117
Carbon/graphite fibers: Environmental exposures and potential health implications
[PB81-229692] N82-11780
Coated-limiter testing in Tokamaks
[DE81-027665] N82-11951

GRAPHITE-EPOXY COMPOSITE MATERIALS
The effects of jet exhaust blast impingements on graphite-epoxy composites --- F-18 aircraft
[AD-A104622] N82-11136

GRAVIMETRY
Principal facts, accuracies, sources, base station descriptions, and plots for 1380 gravity stations in the Tonopah 1 deg by 2 deg Quadrangle, Nevada
[PB81-219081] N82-11716

GRAVITATIONAL EFFECTS
Growth of solid solution single crystals --- mercury cadmium tellurides
[NASA-CR-161891] N82-11958

GRAVITY ANOMALIES
Principal facts, accuracies, sources, base station descriptions, and plots for 1380 gravity stations in the Tonopah 1 deg by 2 deg Quadrangle, Nevada
[PB81-219081] N82-11716

GREAT LAKES (NORTH AMERICA)
Industrial process fugitive emissions inventory for the Region V Great Lakes shoreline
[PB81-212037] N82-11658

GREAT PLAINS CORRIDOR (NORTH AMERICA)
Great Plains gasification project, Mercer County, North Dakota; water assessment report section 13(c)
[PB81-216111] N82-11524
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525

GROUND STATE
Direct observation of excited oxygen atom production and deactivation N82-11868

GROUND STATIONS
A dedicated 26-m SETI sky survey instrument facility: A feasibility study N82-11281
DSN ground communication facility N82-11282
Networks consolidation program N82-11283
Relocation of the Deep Space Network Maintenance Center N82-11305
Goldstone high power radiation control N82-11308

GROUND SUPPORT EQUIPMENT
NOCA upgrade N82-11304

GROUND WATER
LLNL underground coal gasification project
[DE81-030634] N82-11267
Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269
Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270
Raft River geothermal project groundwater monitoring program
[DE81-030202] N82-11521
Water resources data for Kentucky, water year 1980
[PB81-223612] N82-11526
Water resources data for Michigan, water year 1980
[PB81-224180] N82-11527
Water resources data for Ohio, water year 1980. Volume 2: St. Lawrence River basin
[PB81-217077] N82-11528
Ground-water hydrology of the Dade City area, Pasco County, Florida, with emphasis on the hydrologic effects of pumping from the Foridian aquifer
[PB81-225518] N82-11529
Water resources of upper separation creek basin, south-central Wyoming
[PB81-224263] N82-11531

GUARDS (SHIELDS)
Performance assessments of precipitation gages for snow measurement
[PB81-218547] N82-11443

GUATEMALA
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

GUST LOADS
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

H

H ALPHA LINE
M-alpha emission from a disk in the close binary U Cephei: A Monte Carlo simulation N82-12001

HALF LIFE
A review and interpretation of recent cosmic ray beryllium isotope measurements
[NASA-CR-164967] N82-12020

HALLEY'S COMET
Telecommunications in cometary environments
[NASA-CR-164956] N82-11340

HARDENING (MATERIALS)
Effects of alloying on aging and hardening processes of steel with 20% nickel
[NASA-TM-76624] N82-11186
Mechanism of Monuron-accelerated dicyandiamide cure of epoxy resins
[AD-A104658] N82-11213

HARMONIC ANALYSIS
Special functions and harmonic analysis on P sub n N82-11824
Acoustic cavitation studies
[AD-A104409] N82-11863

HAWAII
Possible use of coal in Hawaii, 1990 - 2000
[DE81-028266] N82-11263
Hawaii mesoscale energy and climate project (HAMEC). 2: P-3 aircraft data sets
[PB81-224198] N82-11747

HAZARDS
Coal mine hazard detection using synthetic pulse radar
[PB81-224412] N82-11538

HEAD-UP DISPLAYS
Study and development of an integrated head-up display
[AD-A104337] N82-11062

HEART
On the active part played by the heart in the venous return of the blood
[RAE-LIB-TRANS-2017] N82-11766

HEAT CAPACITY MAPPING MISSION
Thermal algorithms analysis --- programming tasks supporting the development of a thermal model of the Earth's surface
[NASA-CR-166716] N82-11800

HEAT EXCHANGERS
A new method of cooling turbine vanes N82-11027
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls
[DE81-029953] N82-11190
Deposition and corrosion phenomena on aluminum surfaces under deluged dry cooling-tower conditions
[DE81-025483] N82-11193

HEAT OF FORMATION
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170

HEAT PIPES
High thermal power density heat transfer --- thermionic converters
[NASA-CASE-LEW-12950-1] N82-11399
Performance predictions and measurements for space-power-system heat pipes
[LA-UR-81-909] N82-11426
Performance limits of gravity-assist heat pipes with simple wick structures
[LA-UR-81-969] N82-11427
Heat-pipe development for high-temperature recuperator application
[LA-UR-81-1414] N82-11428

HEAT PUMPS
Cycle and performance analysis of absorption heat pumps for waste heat utilization
[DE81-030705] N82-11405
Parametric sensitivity study for solar-assisted heat-pump systems
[DE81-030309] N82-11407
Design, operation and performance of a ground coupled heat pump system in a cold climate
[DE81-024257] N82-11412
DOE solar-assisted heat-pump program: Its evolution and its potential
[DE81-026055] N82-11413
Chemical heat pump program: An overview
[DE81-025086] N82-11414
Computer-aided heat-pump design and optimization
[DE81-024965] N82-11415
Laboratory determination of frosting and defrosting losses for a high efficiency air-source heat pump
[DE81-023218] N82-11416
Alternative heat pump cycle studies
[DE81-024983] N82-11417
Investigation of direct expansion in ground source heat pumps
[DE81-024139] N82-11418

Well-water-source heat pump field performance study
[DE81-024136] N82-11419

Conduct a state-of-the-art survey of existing knowledge for the design of ground-source heat pumps
[DE81-024084] N82-11420

Heat pump R and D at Oak Ridge National Laboratory
[DE81-024121] N82-11422

Diaphragm Stirling engine heat-actuated heat pump development
[DE81-024076] N82-11423

Development and demonstration of an ammonia-water absorption heat pump
[DE81-024126] N82-11424

Brayton/Rankine 10-ton gas-fired space conditioning system, phase 2
[PB81-223372] N82-11478

Solar heat pump simulator
[DE81-024368] N82-11583

Light-commercial Brayton/Rankine space-conditioning system
[DE81-024137] N82-11586

HEAT RESISTANT ALLOYS

Materials technology for coal-conversion processes
[DE81-028474] N82-11169

The quantitative determination of non-metallic inclusions by a mathematical statistical method
[RAE-LIB-TRANS-2066] N82-11179

Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182

Activation of superalloys and stainless steels for chromium plating
[AD-A104313] N82-11188

Irradiation-induced swelling in commercial alloys
[DE81-029755] N82-11191

HEAT SHIELDING

Novel design of pressure vessels and thermal shields in coal gasifiers
[DE81-025828] N82-11474

HEAT SOURCES

Investigation of direct expansion in ground source heat pumps
[DE81-024139] N82-11418

Space nuclear safety and fuels program
[DE81-030501] N82-11891

HEAT STORAGE

Lightweight concrete materials and structural systems for water tanks for thermal storage
[COO-4703-26] N82-11501

Hodges residence: Performance of a direct gain passive solar home in Iowa
[DE81-025528] N82-11581

Controls for solar heating and cooling
[DE81-025209] N82-11593

Attached sunspace design analysis
[DE81-028738] N82-11601

Heat storage duration
[DE81-026635] N82-11602

HEAT TRANSFER

Proposed simplified energy calculation procedure for use in energy conservation standards activities
[DE81-027190] N82-11319

Studies of heat transfer and water migration in soils
[DE81-023951] N82-11425

Fluid-bed heat-exchanger optimization and bed materials selection
[DOE/ET-11343/T2] N82-11571

Geothermal heat transfer, district heating and cooling
[DE81-023195] N82-11587

Meridional heat transport at the onset of winter stratospheric warming
[NASA-TM-76614] N82-11697

Jet impingement heat transfer enhancement for the GPU-3 Stirling engine
[NASA-TM-82727] N82-11993

HEAT TRANSMISSION

Performance limits of gravity-assist heat pipes with simple wick structures
[LA-UR-81-969] N82-11427

Imperfect magnetosphere-ionosphere coupling and discrete auroras
[AD-A104509] N82-11699

HEATING

Geothermal heat transfer, district heating and cooling
[DE81-023195] N82-11587

HEATING EQUIPMENT

Ice protection system technology N82-11060

Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224

Energy analysis sample building data
[DE81-027188] N82-11318

Design, operation and performance of a ground coupled heat pump system in a cold climate
[DE81-024257] N82-11412

HEAVY IONS

Bragg curve spectroscopy
[DE81-025827] N82-11161

Heavy ion fusion program at Argonne
[DE81-023905] N82-11902

Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903

HEIGHT

A simplified procedure for direct determination of real heights from virtual height data
[AD-A104374] N82-11702

The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739

HELICOPTER CONTROL

Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064

Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065

HELICOPTERS

Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056

Helicopter rotor trailing edge noise — noise prediction
[NASA-CR-3470] N82-11859

HELIOSTATS

Heliostat operation at the central receiver test facility (1978 - 1980)
[DE81-031926] N82-11556

Second generation heliostat, volume 1
[DE81-029618] N82-11564

Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029824] N82-11565

Second generation heliostat program, September 1979-March 1981
[DE81-029752] N82-11570

The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute
[PB81-226813] N82-11625

HERMETIC SEALS

Semiconductor measurement technology ARPA/NBS Workshop Moisture Measurement Technology for Hermetic Semiconductor Devices
[PB81-220733] N82-11384

HETERODYNING

Large gain, negative resistance, and oscillations in superconducting quasiparticle heterodyne mixers
[AD-A104534] N82-11361

HETEROJUNCTION DEVICES

InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452

HETEROJUNCTIONS

Cadmium sulfide/copper sulfide heterojunction cell research by sputter deposition
[DE81-026219] N82-11553

Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE81-025587] N82-11577

HIGH ASPECT RATIO

The comparison between the unsteady pressure fields calculated and measured on the ZKP model
[RAE-LIB-TRANS-2061] N82-11029

HIGH CURRENT

Energy losses in conductors carrying very high currents
[DE81-025367] N82-11373

HIGH ENERGY INTERACTIONS

Role of excited states of molecular ions in structure studies with high-energy collisions
[DE81-023898] N82-11881

Detection and study of new heavy particles through jet identification
[DE81-025151] N82-11882

HIGH POWER LASERS

Analytical description of time characteristics of high power laser pulses N82-11448

Conceptual design of an angular multiplexed rare gas halide laser fusion driver
[DE81-029900] N82-11458

Nova pulse power system description and status
[DE81-025600] N82-11898

HIGH PRESSURE

Performance of a 100-kV, 78kJ electric-gun system
[DE81-025603] N82-11374

JT8D high pressure compressor performance improvement
[NASA-CR-165531] N82-11467

High-pressure optical studies
[DE81-025577] N82-11918

HIGH STRENGTH STEELS

Determination of exact orientation relationships between martensite and austenite in steels by microdiffraction
[LBL-12289] N82-11195

HIGH TEMPERATURE

One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158

Design of refractories for resistance to high-temperature erosion-corrosion
[DE81-904208] N82-11217

High thermal power density heat transfer — thermionic converters
[NASA-CASE-LEW-12950-1] N82-11399

Design, cost and performance comparisons of several solar thermal systems for process heat. Volume 1: Executive summary
[DE81-029881] N82-11576

HIGH TEMPERATURE ENVIRONMENTS

High-temperature enthalpy and X-ray powder diffraction data for aluminum sulfide (Al2S)
[PB81-226250] N82-11174

Heat-pipe development for high-temperature recuperator application
[LA-UR-81-1414] N82-11428

HIGH TEMPERATURE GASES

Workshop proceedings: Combustion Turbine Residual Oil
[EPRI-WS-80-132] N82-11261

Selected studies of four high-temperature air-pollution sources N82-11680

HIGH TEMPERATURE RESEARCH

Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089

Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76608] N82-11120

HIGH VOLTAGES

High-voltage air-core pulse transformers
[DE81-030999] N82-11370

HOLDERS

Scriber for silicon wafers
[NASA-CASE-NPO-15539-1] N82-11469

HOLLOW CATHODES

Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888

HOLOGRAPHIC INTERFEROMETRY

Acta Mechania Sinica
[AD-A105635] N82-12021

On the capacity of holographic phase-shift interferometric technique in the visualization of low density flows N82-12024

HOMING

Application of optimal control techniques to tactical missile guidance N82-11086

HOMOGENEITY

Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508

HOMOGENEOUS TURBULENCE

Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394

Numerical simulation of a compressible homogeneous, turbulent shear flow
[NASA-CR-164953] N82-11396

HOOKES LAW
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508
HORIZONTAL FLIGHT
Algorithm for fuel conservative horizontal capture trajectories
[NASA-TM-81334] N82-11018
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
HORIZONTAL ORIENTATION
Yawing of wind turbines with blade cyclic pitch variation
[DE81-030091] N82-11045
HORN ANTENNAS
Design of throat section of conical corrugated horns N82-11292
HOT CORROSION
Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76608] N82-11120
HOT PRESSING
Advanced selenide thermoelectric development program
[DE81-027823] N82-11562
HUGONIOT EQUATION OF STATE
RATFIT: A rational equation-of-state fitting program
[DE81-027273] N82-11812
HUMAN FACTORS ENGINEERING
Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065
Standard specification for industrial safety-belt assemblies
[SABS-809-1980] N82-11278
Conceptual design of a computer-generated topographic display system to aid mission planning and mission conduct by Army aviators
[AD-A104388] N82-11517
USSR report. Life sciences biomedical and behavioral sciences, no. 12
[JPRS-79338] N82-11762
Measuring/computing complex for automation of ergonomic experiments N82-11765
HUMAN PERFORMANCE
The effects of the symbology and spatial arrangement of software specifications in a debugging task
[AD-A104541] N82-11806
HUMAN REACTIONS
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636
HURRICANES
Numerical studies of hurricane-ocean interactions
[PB81-225575] N82-11741
HYBRID CIRCUITS
Manufacturing methods and technology engineering for tape chip carrier
[AD-A104393] N82-11365
HYBRID COMPUTERS
Use of a hybrid computer for the flight simulation of a bomb/parachute system
[DE81-025141] N82-11797
HYDRAULIC EQUIPMENT
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072
HYDRAZINES
Optoacoustic spectroscopy to detect hydrazine fuels
[AD-A104675] N82-11229
HYDROCARBON FUEL PRODUCTION
Jet fuel locks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
Solar coal-gasification reactor for hydrocarbon-free synthesis gas
[DE81-026600] N82-11247
HYDROCARBON FUELS
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE81-028209] N82-11168
Transportation fuels from synthetic gas
[DE81-029614] N82-11258
HYDROCARBONS
Development and optimization of methodologies for analysis of complex hydrocarbon mixtures
[DE81-025875] N82-11114
Thermal and electrochemical biomass conversion at SERI
[DE81-030507] N82-11563
Kinetics of NO/ sub x formation during early stages of pulverized-coal combustion
[DE81-029071] N82-11641
HYDROCRACKING
Vapor-phase cracking and wet oxidation as potential pollutant control techniques for coal gasification
[PB81-219594] N82-11661
HYDRODYNAMICS
Linear and nonlinear theory study of Alpha Virginis
[DE81-025335] N82-12006
Compressible convection in a rotating spherical shell — latitudinal differential rotation on the Sun
[PB81-222895] N82-12018
HYDROELECTRIC POWER STATIONS
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8: Design approaches: UPH
[DE81-030673] N82-11620
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 9: Design approaches: CAES, appendix C. Major mechanical equipment
[DE81-030672] N82-11621
HYDROFOILS
Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing
[AD-A104562] N82-11402
HYDROGEN
Trap activation model for hydrogen retention and isotope exchange in some refractory materials
[DE81-025995] N82-11221
Hydrogen storage-bed design for tritium systems test assembly
[DE81-025336] N82-11262
An error budget for the JPL hydrogen maser receiver N82-11297
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027234] N82-11557
One-dimensional magnetohydrodynamic calculations of a hydrogen-gas puff
[UCRL-85867] N82-11940
HYDROGEN ATOMS
H-O precessor computer code
[DE81-026669] N82-11814
The hydrogen atom in a strong uniform magnetic field N82-11866
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927
HYDROGEN COMPOUNDS
Impurity effects in a-Si:H solar cells
[DE81-025069] N82-11575
HYDROGEN EMBRITTLEMENT
Adsorption of hydrogen on iron and the hydrogen embrittlement of steel
[DE81-025164] N82-11196
Hydrogen damage in stainless steel
[DP-MS-81-31] N82-11197
HYDROGEN FUELS
Technical and economic aspects of hydrogen storage in metal hydrides
[NASA-TM-76610] N82-11223
The storage of hydrogen in the form of metal hydrides: An application to thermal engines
[NASA-TM-76609] N82-11225
HYDROGEN IONS
Trapping and release of implanted D/H ions in fused silica
[DE81-024441] N82-11974
HYDROGEN ISOTOPES
Investigation of mechanisms of hydrogen transfer in coal hydrogenation
[DE81-030492] N82-11165
HYDROGEN PRODUCTION
Hydride chemical compressor, phase 1
[DE81-030199] N82-11155
Hydrogen production from the photosynthetic bacterium Rhodopseudomonas sphaeroides
[DE81-025831] N82-11256
HYDROGEN-BASED ENERGY
Fusion as a source of synthetic fuels
[BNL-29281] N82-11257
HYDROGENATION
Investigation of mechanisms of hydrogen transfer in coal hydrogenation
[DE81-030492] N82-11165
Coal hydrogenation via bonding of metallic compounds to coal, part 1. Solubilization of Illinois bituminous coal - the critical importance of methylene group cleavage, part 2
[DE81-027562] N82-11236
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/1] N82-11259
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/2] N82-11260
HYDROGEOLOGY
Ground-water hydrology of the Dade City area, Pasco County, Florida, with emphasis on the hydrologic effects of pumping from the Foridian aquifer
[PB81-225518] N82-11529
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534
HYDROGRAPHY
An inverse technique for determination of mean ocean circulation N82-11756
HYDROLOGY
Water resources data for Kentucky, water year 1980
[PB81-223612] N82-11526
Water resources data for Michigan, water year 1980
[PB81-224180] N82-11527
Water resources data for Ohio, water year 1980. Volume 2: St. Lawrence River basin
[PB81-217077] N82-11528
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734
HYDROLYSIS
Thermal control coatings based on trialkoxysilane hydrolysate binders — tolerance to ultraviolet radiation in vacuum
[NASA-CASE-MFS-25620-1] N82-11118
Cattail rhizome-derived alcohol
[DE81-028307] N82-11234
HYPERBOLIC COORDINATES
Characters of rank two hyperbolic Lie algebras as functions at quasiregular cusps N82-11821
HYPERBOLIC FUNCTIONS
Upwind difference schemes for hyperbolic systems of conservation laws N82-11820
Characters of rank two hyperbolic Lie algebras as functions at quasiregular cusps N82-11821
Linear evolution equations of hyperbolic type in a locally convex space N82-11850
HYPERTENSION
Effects of curative treatment emphasizing endurance training on the performance and blood pressure of hypertensive and normotensives
[NASA-TM-76520] N82-11771
HYPERVELOCITY GUNS
Acta Mechanica Sinica (selected articles)
[AD-A105636] N82-11019
Compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel N82-11021
HYPOKINESIA
Cyclic nucleotides in tissues during long-term hypokinesia
[NASA-TM-76726] N82-11757
Electron microscopical and histochemical studies on the transverse striated muscles of birds after prolonged hypokinesis
[NASA-TM-76717] N82-11759
HYPOTHESES
Fatigue initiation at a high or low number of cycles
[RAE-LIB-TRANS-2056] N82-11487
HYSTERESIS
Application of a rare-earth cobalt magnet to synchronous motors
[NAL-TR-656] N82-11358

I

ICE FORMATION
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Operational environment, meteorological conditions and weather forecasting N82-11057
Technology base for icing instrumentation and mathematical modelling N82-11058
Facilities for development and clearance N82-11059
Ice protection system technology N82-11060
Proposed standard requirements and procedures for icing clearance N82-11061
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-76617] N82-11725

ICE MAPPING
Ice conditions in the eastern Bering Sea from NOAA and LANDSAT imagery: Winter conditions 1974, 1976, 1977, 1979
[PB81-220188] N82-11537

ICE PREVENTION
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system — Lewis icing research tunnel
[NASA-CR-164966] N82-11052
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053

ICE REPORTING
Ice conditions in the eastern Bering Sea from NOAA and LANDSAT imagery: Winter conditions 1974, 1976, 1977, 1979
[PB81-220188] N82-11537

IGNITION
Uncertainties associated with inertial-fusion ignition
[DE81-025408] N82-11944

IMAGE PROCESSING
Identification of lithologic units using multichannel imaging systems N82-11509
Military geodesy and geospace science, unit three
[AD-A105072] N82-11711
SAR processing on the MPP
[NASA-CR-166726] N82-11801
Computer processing of periodic electron micrographs N82-11815

IMAGERY
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738

IMAGING TECHNIQUES
Digital SAR processing using a fast polynomial transform N82-11295
Reliability and maintainability assessment report for laser scanner image generation system, revision A
[AD-A104239] N82-11455
Second Image Generation/Display Conference: Closing comments — flight simulators
[AD-A104676] N82-11807
Computer processing of periodic electron micrographs N82-11815
Microstructures for high-energy X-ray and particle-imaging applications
[DE81-026531] N82-11899

IMMOBILIZATION
Participation of the hypophyseal-adrenal cortex system in thrombin clearance during immobilization stress
[NASA-TM-76729] N82-11760

IMPACT TESTING MACHINES
Side impact sled and padding development
[PB81-217952] N82-11092

IMPEDANCE MATCHING
Antenna-plasma coupling theory for ICRF heating of large Tokamaks
[DE81-029815] N82-11933

IMPEDANCE MEASUREMENTS
A new method for measuring the acoustic impedance of the ground N82-11856

IMPLOSIONS
Report of laser activities: 1978 - 1979
[DE81-028997] N82-11459
One-dimensional magnetohydrodynamic calculations of a hydrogen-gas puff
[UCRL-85867] N82-11940
Uncertainties associated with inertial-fusion ignition
[DE81-025408] N82-11944
Shock effects in particle-beam fusion targets
[DE81-027806] N82-11952

IMPREGNATING
SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board
[DE81-903377] N82-11615

IMPURITIES
The effects of impurities on the performance of silicon solar cells
[NASA-CR-164945] N82-11548

IN-FLIGHT MONITORING
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064
Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065

INCENTIVES
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 6: Innovation by regulation: The administration of control technology requirements under the Clean Air Act
[PB81-221616] N82-11664
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 7: Periodic review and technological escalation of performance standards: New source performance standards review process
[PB81-213117] N82-11665
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 8: Controlled trading and site-specific SIP revisions: Competing for attention in a crowded administrative route
[PB81-218273] N82-11666

INCOMPRESSIBLE FLOW
Generation of axi-symmetric body shapes in subsonic flow by means of polynomial distributions of sources and doublets along the axis of symmetry
[C-OF-A-MEMO-8110] N82-11038

INDEPENDENT VARIABLES
The determination of navigational and meteorological variables measured by NOAA/RFC WP3D aircraft
[PB81-225468] N82-11743

INDEXES (DOCUMENTATION)
NASA Patent Abstracts Bibliography: A continuing bibliography, section 2, indexes. Supplement 19
[NASA-SP-7039(19)-SEC-2] N82-11982

INDIAN OCEAN
Comparison of ocean and island rainfall in the tropical South Pacific, Atlantic, and Indian Oceans
[PB81-225401] N82-11745

INDIUM PHOSPHIDES
InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452
Analysis of indium-phosphide/indium tin oxide solar cells
[DE81-025907] N82-11610

INDUCTION MOTORS
Motor power factor controller with a reduced voltage starter
[NASA-CASE-MFS-25586-1] N82-11360

INDUCTORS
Proton induction linacs as high-intensity neutron sources
[DE81-025825] N82-11878

INDUSTRIAL ENERGY
Alternative fuel for the steel industry of Northern Indiana: A prefeasibility study of a central coal gasification project
[DE81-029314] N82-11233
Feasibility and economic study of medium-BTU coal gas blended with high-BTU by product gas as an industrial energy source at Billings, Montana
[DE81-025166] N82-11237
Conceptual design for a multi-user medium BTU coal gasification complex. Volume 1: Executive summary
[DE81-027139] N82-11238
Workshop proceedings: Combustion Turbine Residual Oil
[EPRI-WS-80-132] N82-11261
Cycle and performance analysis of absorption heat pumps for waste heat utilization
[DE81-030705] N82-11405
Study of photovoltaic cost elements. Volume 5: Installation cost model for intermediate PV systems: Users manual
[DE81-030981] N82-11569

INDUSTRIAL PLANTS
Development of a small-scale commercial alcohol dehydration 190 to 200 proof
[DE81-030158] N82-11235
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029824] N82-11565
Second generation heliostat program, September 1979-March 1981
[DE81-029752] N82-11570

INDUSTRIAL SAFETY
Standard specification for industrial safety-belt assemblies
[SABS-809-1980] N82-11278
Low-Btu-gasifier emissions toxicology
[DE81-031000] N82-11651
Carbon/graphite fibers: Environmental exposures and potential health implications
[PB81-229692] N82-11780
Handbook for industrial noise control
[NASA-SP-5108] N82-11858

INDUSTRIAL WASTES
Preliminary development of a technique for estimating municipal-solid-waste generation
[DE81-024152] N82-11590
Industrial process fugitive emissions inventory for the Region V Great Lakes shoreline
[PB81-212037] N82-11658

INELASTIC SCATTERING
Elastic and inelastic psi production by muons
[DE81-025326] N82-11877

INEQUALITIES
A general moment inequality for the maximum of rectangular partial sums of multiple series
[AD-A104475] N82-11826
An upper bound on the probability density function in terms of Fisher information. A bound to the density function
[AD-A104474] N82-11837

INERT ATMOSPHERE
Method for retarding dye fading during archival storage of developed color photographic film — inert atmosphere
[NASA-CASE-MFS-23250-1] N82-11432

INERTIAL CONFINEMENT FUSION
Conceptual design of an angular multiplexed rare gas halide laser fusion driver
[DE81-029900] N82-11458
Electron-temperature requiremernts for neutralized inertial-confinement-fusion light-ion beams
[DE81-025352] N82-11884
Nova pulse power system description and status
[DE81-025600] N82-11898
Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903
Considerations for the design, implementation, and effective operation of Sandia's super-power generators
[DE81-025404] N82-11908
Shock effects in particle-beam fusion targets
[DE81-027806] N82-11952
Scalability of light ion beams to reach fusion conditions
[DE81-024443] N82-11953

INERTIAL FUSION (REACTOR)
Conceptual design of an angular multiplexed rare gas halide laser fusion driver
[DE81-029900] N82-11458
Production and characterization of pure cryogenic inertial fusion targets
[DE81-025920] N82-11937
Uncertainties associated with inertial-fusion ignition
[DE81-025408] N82-11944

INFERENCE
Prediction, diagnosis, and causal thinking in forecasting
[AD-A104372] N82-11843

INFORMATION DISSEMINATION
Microfiche as a vehicle for technical reports
[PB81-228009] N82-11986
INFORMATION RETRIEVAL
Content representation for retrieval
[PB81-170672] N82-11984
INFORMATION SYSTEMS
Design methodology and development history of an ISO OSI layered architecture for the Canadian Broadcast Telidon system
[CRC-TN-708-E] N82-11337
Remote Medical Diagnosis System RMDS design review meeting minutes
[AD-A104555] N82-11772
INFORMATION THEORY
Evaluation of uncertainties in geologic information
[DE81-025997] N82-11714
DARTAB: A program to combine airborne radionuclide environmental exposure data with dosimetric and health effects data to generate tabulations of predicted health impacts
[DE81-030434] N82-11774
INFRARED IMAGERY
An assessment of detecting mesoscale rainfall from mid-latitude cyclones using GOES imagery data
[AD-A104377] N82-11726
INFRARED LASERS
InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452
Magneto-optically modulated CH3OH laser for Faraday rotation measurements in Tokamaks
[DE81-027298] N82-11462
INFRARED REFLECTION
Inclusion of a simple vegetation layer in terrain temperature models for thermal infrared (IR) signature prediction
[AD-A104469] N82-11910
INFRARED SPECTRA
An analysis of cloud property retrieval using infrared sounder data
[PB81-221608] N82-11732
INFRARED SPECTROSCOPY
Surface analysis by Fourier transform infrared (Ftir) spectroscopy
[DE81-025741] N82-11150
Proof of concept study
[AD-A104338] N82-11639
Far-infrared measurements of trace gases
[NASA-CR-164965] N82-11698
INITIATION
Numerical model study of burning and detonation in small PETN-loaded assemblies
[DE81-028594] N82-11162
Correlation of shock-initiation tests for explosives and propellants
[DE81-026533] N82-11264
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
INJECTION
Boosting up of neutral beam heating power by slowly rising toroidal field --- compression
[IPPJ-534] N82-11929
INLET FLOW
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor N82-11025
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043
INORGANIC COMPOUNDS
Nitrogen dynamics in a lagoon development and an adjacent salt marsh N82-11632
INPUT
Mathematical investigation of linear control systems containing input derivatives N82-11819
INSOLATION
Low-cost solar array project: Four absolute cavity radiometer (pyrheliometer) intercomparisons at New River, Arizona: Radiometer standards
[NASA-CR-164950] N82-11435
Mississippi County Community College solar photovoltaic project
[DE81-030669] N82-11554
INSPECTION
Standard specification for light ladders
[SABS-1304-1980] N82-11277
INSTALLING
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566
Study of photovoltaic cost elements. Volume 3: Sandia National Laboratories photovoltaic systems design catalog
[DE81-030986] N82-11567
Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568
Study of photovoltaic cost elements. Volume 5: Installation cost model for intermediate PV systems: Users manual
[DE81-030981] N82-11569
INSULATION
Scalability of light ion beams to reach fusion conditions
[DE81-024443] N82-11953
INSULATORS
Elastomer unistructure insulators
[DE81-024366] N82-11219
INTEGRAL CALCULUS
Vector integrals and products of vector measures N82-11847
INTEGRAL EQUATIONS
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035
Closed form evaluation of symmetric two-sided complex integrals N82-11299
INTEGRATED CIRCUITS
R&D services to develop an improved isolation technology radiation hardened bipolar integrated circuits (PEDIC)
[AD-A104657] N82-11367
Modeling and elimination of latch-up in bulk CMOS integrated circuits
[DE81-017413] N82-11377
Semiconductor measurement technology ARPA/NBS Workshop Moisture Measurement Technology for Hermetic Semiconductor Devices
[PB81-220733] N82-11384
INTEGRATED ENERGY SYSTEMS
Analysis of the fuel and cost effects of interfacing utilities and small-power cogenerators
[DE81-028495] N82-11579
INTERACTIONS
The individual versus the computer: An examination of attitude problems and their impact on system development
[AD-A104636] N82-11977
INTERACTIVE CONTROL
GRAMPS: A graphics language interpreter for real time, interactive, three dimensional picture editing and animation
[DE81-027398] N82-11811
INTERFACE STABILITY
Pulsed-echo interface wave characterization of bolted plates N82-11126
Attenuation of ultrasonic interface waves on metal-polymer-metal boundaries N82-11127
INTERFACES
Interface reactions in Mg/Zn3P2 solar cells
[DE81-025773] N82-11597
INTERFACIAL ENERGY
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183
INTERFACIAL TENSION
Acoustic cavitation studies
[AD-A104409] N82-11863
INTERFEROMETERS
Optical fiber interferometer for the study of ultrasonic waves in composite materials
[NASA-CR-164916] N82-11121
Optical fiber interferometer for the study of ultrasonic waves in composite materials, discussion N82-11122
DC calibration of the strain sensitivity of a single mode optical fiber interferometer N82-11124
Detection of acoustic emission in composites by optical fiber interferometry N82-11125
Optical detection of pulsed surface particle displacements N82-11131
Wideband optical measurements of ultrasonic pulses N82-11132
Dual differential interferometer for measurements of broadband surface acoustic waves N82-11133
Digital control of machine tools
[DE81-029950] N82-11476
Reflection/transmission phase shift interferometer and viewing optics
[DE81-027658] N82-11916
INTERMETALLICS
Effects of alloying on aging and hardening processes of steel with 20% nickel
[NASA-TM-76624] N82-11186
INTERNAL COMBUSTION ENGINES
Assessment of I.C. engines as drivers for heat actuated heat pumps
[DE81-024086] N82-11421
INTERNAL FRICTION
Contribution to the characterization of the anelastic properties of multi-phase systems
[DE81-025581] N82-11198
INTERNATIONAL COOPERATION
International safeguards for spent fuel storage
[DE81-029896] N82-11892
INTERNATIONAL SUN EARTH EXPLORERS
Magnetic Field Investigation for ISEE mother and daughter spacecraft --- magnetometer design, capability, and results
[NASA-CR-166713] N82-11105
INTERNATIONAL TRADE
US energy strategies: Some options for eliminating oil imports by the year 2000
[PB81-226052] N82-11626
INTERPLANETARY MAGNETIC FIELDS
Geomagnetic observations N82-11693
INTERPROCESSOR COMMUNICATION
Microcomputer-controlled communication network for Sandia National Laboratories' environmental test chambers
[DE81-030988] N82-11355
INTERSTELLAR MASERS
Radio astronomy N82-11280
INVISCID FLOW
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted N82-11015
ION ACCELERATORS
Proton induction linacs as high-intensity neutron sources
[DE81-025825] N82-11878
Heavy ion fusion program at Argonne
[DE81-023905] N82-11902
ION ATOM INTERACTIONS
Ion-reversibility studies in amorphous solids using the two-atom scattering model
[DE81-025188] N82-11886
ION BEAMS
Electron-temperature requiremernts for neutralized inertial-confinement-fusion light-ion beams
[DE81-025352] N82-11884
Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903
Considerations for the design, implementation, and effective operation of Sandia's super-power generators
[DE81-025404] N82-11908
Scalability of light ion beams to reach fusion conditions
[DE81-024443] N82-11953
ION CYCLOTRON RADIATION
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925
ION IMPLANTATION
Trapping and surface permeation of deuterium in Fe, Ni and stainless steel: An ion-beam study
[DE81-023303] N82-11201
Processing of silicon solar cells by ion implantation and laser annealing
[NASA-CR-165283] N82-11546
Trapping and release of implanted D/H ions in fused silica
[DE81-024441] N82-11974
ION SCATTERING
Ion-reversibility studies in amorphous solids using the two-atom scattering model
[DE81-025188] N82-11886
ION SOURCES
Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888

Scalability of light ion beams to reach fusion conditions
[DE81-024443] N82-11953

ION TEMPERATURE
Boosting up of neutral beam heating power by slowly rising toroidal field — compression
[IPPJ-534] N82-11929
Ion thermal conductivity for a pure Tokamak plasma
[DE81-029710] N82-11932

IONIC COLLISIONS
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927

IONIC MOBILITY
Plasma confinement in the TMX tandem mirror
[UCRL-85883] N82-11939

IONIZATION
Ionization fluctuations in collisional ionizing shock waves — plasma interactions N82-11864
Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968

IONIZATION CHAMBERS
Bragg curve spectroscopy
[DE81-025827] N82-11161

IONIZING RADIATION
Effects of ionizing radiation on the chemical structure, crystalline content and molecular weight distribution of various Teflon resins N82-11203

IONOSPHERE
Imperfect magnetosphere-ionosphere coupling and discrete auroras
[AD-A104509] N82-11699

IONOSPHERIC ELECTRON DENSITY
Plasmaspheric, faraday and total electron contents, 1977 and 1978
[AD-A104362] N82-11700

IONOSPHERIC PROPAGATION
Effect of energetic particle events on VLF/LF propagation parameters, 1974 - 1977
[AD-A104508] N82-11344

IONOSPHERIC STORMS
ALTAIR radar study of equatorial spread F
[AD-A104554] N82-11710

IONS
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438

IRON
Adsorption of hydrogen on iron and the hydrogen embrittlement of steel
[DE81-025164] N82-11196
Trapping and surface permeation of deuterium in Fe, Ni and stainless steel: An ion-beam study
[DE81-023303] N82-11201
Monte Carlo calculations of the melting point of iron at core pressures N82-11681
Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron
[DE81-025540] N82-11973

IRON ALLOYS
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76620] N82-11180

IRON COMPOUNDS
Use of nuclear resonant scattering of Gamma rays for in vivo measurement of iron
[DE81-026051] N82-11775

IRON OXIDES
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663

IRRADIATION
Radiation testing of composite materials, in situ versus ex situ effects
[NASA-CR-3475] N82-11116
Irradiation-induced swelling in commercial alloys
[DE81-029755] N82-11191
Pulsed DF laser effects study
[AD-A104575] N82-11457
Mechanistic analysis of loft pulsed neutron activation data — pipe flow velocity
[DE81-027124] N82-11876
Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903
Laser excitation of surface electronic states for a one-dimensional semiconductor
[AD-A104522] N82-11964

IRRIGATION
Irrigation market for solar thermal parabolic dish systems
[NASA-CR-164955] N82-11549

ISLANDS
Comparison of ocean and island rainfall in the tropical South Pacific, Atlantic, and Indian Oceans
[PB81-225401] N82-11745

ISOBARS (PRESSURE)
The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739

ISOTOPE SEPARATION
Trap activation model for hydrogen retention and isotope exchange in some refractory materials
[DE81-025995] N82-11221
Lasers in materials processing
[DE81-027657] N82-11460

ISOTOPES
Statistical versus valence neutron neutron capture in Mo-98
[DE81-023943] N82-11880

ISOTROPIC TURBULENCE
Theoretical investigation of a passive scalar such as temperature in isotropic turbulence N82-11386
Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394

ISOTROPY
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508

J

JET AIRCRAFT NOISE
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860

JET ENGINE FUELS
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-025961] N82-11167
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224
Jet fuel locks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

JET FLOW
Research on the recirculating flow rate in the wake of two-dimensional flame stabilizers (under cold conditions) N82-11028
Impinging jets
[PB81-227902] N82-11392

JET IMPINGEMENT
The effects of jet exhaust blast impingements on graphite-epoxy composites — F-18 aircraft
[AD-A104622] N82-11136
Impinging jets
[PB81-227902] N82-11392
Jet impingement heat transfer enhancement for the GPU-3 Stirling engine
[NASA-TM-82727] N82-11993

K

KALMAN FILTERS
Speciation of labile and quasi-labile metal complex systems using the Kalman filter
[DE81-025678] N82-11194

KENTUCKY
Solvent-Refined Coal-1 Demonstration Project. Final environmental impact statement, Volume 1 of 2 — coal liquefaction plant at Newman, Kentucky
[DE81-025983] N82-11252
Water resources data for Kentucky, water year 1980
[PB81-223612] N82-11526

KERNEL FUNCTIONS
A computer solution to the stationary Navier-Stokes equations in two dimensions with proven convergence
[NASA-TM-81300] N82-11398
Bounded limit for the Monte Carlo point-flux-estimator
[DE81-026526] N82-11883
Acta Mechania Sinica
[AD-A105635] N82-12021
On the kernel function collocation method in steady subsonic flow for wing with control surfaces N82-12023

KINETIC ENERGY
An energy integral and variational principle for plasma kinetic modes
[IPPJ-531] N82-11926

KINETIC EQUATIONS
Ion thermal conductivity for a pure Tokamak plasma
[DE81-029710] N82-11932

KNUDSEN FLOW
Use of molecular beams to support microspheres during plasma coating
[DE81-025601] N82-11873

L

LABORATORY EQUIPMENT
Guide to the evaluation and use of an atomic absorption spectrophotometer
[PB81-222853] N82-11444

LADDERS
Standard specification for light ladders
[SABS-1304-1980] N82-11277

LAGOONS
Nitrogen dynamics in a lagoon development and an adjacent salt marsh N82-11632
Stabilization characteristics of deposits of biologic solids generated in aerated lagoons
[PB81-224297] N82-11668

LAMINAR BOUNDARY LAYER
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

LAMINAR FLOW
Investigation of heat transfer in straight and curved rectangular ducts for laminar and transition flows
[AD-A104604] N82-11401

LAMINATES
An improved transverse shear deformation theory for laminated antisotropic plates
[NASA-TP-1903] N82-11488

LAND MANAGEMENT
Adaptation of land use to surficial geology in metropolitan Washington, D.C. N82-11718

LAND USE
An evaluation of the spatial resolution of soil moisture information
[NASA-CR-166724] N82-11513
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514
Adaptation of land use to surficial geology in metropolitan Washington, D.C. N82-11718

LANGUAGE PROGRAMMING
Elements of programming linguistics. Part 1: The lambda calculus and its implementation
[AD-A104345] N82-11805

LANTHANUM
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900

LANTHANUM COMPOUNDS
The use of lanthanide chelates as selective complexing sorbents for gas chromatography N82-11139

LARGE SCALE INTEGRATION
Modeling and elimination of latch-up in bulk CMOS integrated circuits
[DE81-017413] N82-11377

LARGE SPACE STRUCTURES
Technology for large space systems: A special bibliography
[NASA-SP-7046(05)] N82-11093
Nonparametric identification of a class of nonlinear close-coupled dynamic systems
[NASA-CR-164948] N82-11098

Parameter estimation of large flexible aerospace structures with application to the control of the Maypole Deployable Reflector
[NASA-CR-164971] N82-11099
On the shape and orientation control of an orbiting shallow spherical shell structure --- shape and orientation control of large dish type receivers/reflectors
[NASA-CR-164970] N82-11100
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems. Volume 1: Executive summary
[NASA-CR-165502-VOL-1] N82-11110
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems, volume 2
[NASA-CR-165502-VOL-2] N82-11111
Study of foldable elastic tubes for large space structure applications, phase 3
[NASA-CR-164929] N82-11493

LASER APPLICATIONS
Acoustic waveguide technique for sensing incipient faults in underground power-transmission cables: Including acousto-optic techniques
[DE81-029626] N82-11381
Lasers in materials processing
[DE81-027657] N82-11460
Laser induced fluoroescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758
Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968

LASER DAMAGE
Determination of pulsed CO2 laser damage thresholds of optical surfaces
[AD-A104424] N82-11456
Antireflecting film development --- for resisting damage from laser pulses
[DE81-030010] N82-11915

LASER FUSION
Conceptual design of an angular multiplexed rare gas halide laser fusion driver
[DE81-029900] N82-11458
Gas-jet laser-plasma interaction experiments
[DE81-027169] N82-11943

LASER GYROSCOPES
Theoretical analysis of effect of Langmuir flow in ring laser N82-11447

LASER MODES
InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452

LASER OUTPUTS
Theoretical investigations into possible X-ray and gamma-ray lasers N82-11445
China report: Science and technology, no. 125
[JPRS-78932] N82-11446
Analytical description of time characteristics of high power laser pulses N82-11448
Analytical description of time characteristics high power laser pulses N82-11449
Characteristics of pulse gold vapor lasor outlined N82-11450
Laser triggered spark gaps under experimental study N82-11451
Reliability and maintainability assessment report for laser scanner image generation system, revision A
[AD-A104239] N82-11455

LASER PLASMA INTERACTIONS
Gas-jet laser-plasma interaction experiments
[DE81-027169] N82-11943

LASER PUMPING
Magneto-optically modulated CH3OH laser for Faraday rotation measurements in Tokamaks
[DE81-027298] N82-11462

LASER SPECTROSCOPY
Molecular spectroscopy and relaxation in supersonic beams N82-11867

LASER TARGET INTERACTIONS
Pulsed DF laser effects study
[AD-A104575] N82-11457
Report of laser activities: 1978 - 1979
[DE81-028997] N82-11459

LASER TARGETS
Production and characterization of pure cryogenic inertial fusion targets
[DE81-025920] N82-11937

LASER WEAPONS
Where are we in the space war?
[NASA-TM-76604] N82-11096

LASERS
China report: Science and technology, no. 125
[JPRS-78932] N82-11446
Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers
[PB81-224610] N82-11920
Gas-jet laser-plasma interaction experiments
[DE81-027169] N82-11943
Laser excitation of surface electronic states for a one-dimensional semiconductor
[AD-A104522] N82-11984

LATCH-UP
Modeling and elimination of latch-up in bulk CMOS integrated circuits
[DE81-017413] N82-11377

LATCHES
Low temperature latching solenoid
[NASA-CASE-MSC-18106-1] N82-11357

LATE STARS
Optical and ultraviolet studies of stellar chromospheres of lambda Andromedae and other late-type stars N82-12003

LATERAL CONTROL
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051

LATTICE PARAMETERS
Theoretical and experimental studies of the electro-optic effect: Toward a microscopic understanding
[AD-A104363] N82-11961

LEACHING
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663

LEAD ACID BATTERIES
Recent advances in lead-acid cell research and development
[DE81-023104] N82-11580
Preventing large-battery explosions
[PB81-227373] N82-11628

LEAD TELLURIDES
Development of MBE grown Pb-salt semiconductor lasers for the 8.0 to 15.0 micrometer spectral region
[NASA-CR-165683] N82-11453

LEADING EDGES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052

LEAST SQUARES METHOD
Constrained adaptive least mean squared filters
[AD-A104625] N82-11830
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925

LEE WAVES
Three-dimensional lee waves in a continuously stratified fluid N82-11387

LEVELING
A model of temperature stratification for correction of leveling refraction
[PB81-225435] N82-11744

LEVITATION
Use of molecular beams to support microspheres during plasma coating
[DE81-025601] N82-11873

LIE GROUPS
Characters of rank two hyperbolic Lie algebras as functions at quasiregular cusps N82-11821

LIFT
Some features of flow past slotted wings
[RAE-LIB-TRANS-2050] N82-11030
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035

LIGANDS
High-pressure optical studies
[DE81-025577] N82-11918

LIGHT IONS
Electron-temperature requiremernts for neutralized inertial-confinement-fusion light-ion beams
[DE81-025352] N82-11884

LIGHT SCATTERING
Light scattering by bubbles in liquids or in glass
[AD-A104241] N82-11912
The deconvolution of aerosol backscattered optical pulses to obtain system-independent aerosol signatures
[AD-A104578] N82-11914
Stimulated Raman scattering in large plasmas
[DE81-026589] N82-11938

LIGHT SOURCES
Workshop on Atomic Physics at the National Synchrotron Light Source
[DE81-023507] N82-11874

LIMESTONE
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663

LIMITERS (FUSION REACTORS)
Physics considerations for the FED limiter
[DE81-027596] N82-11950
Coated-limiter testing in Tokamaks
[DE81-027665] N82-11951

LIMITS (MATHEMATICS)
An upper bound on the probability density function in terms of Fisher information. A bound to the density function
[AD-A104474] N82-11837
Bounded limit for the Monte Carlo point-flux-estimator
[DE81-026526] N82-11883

LINE OF SIGHT
Estimates for the probabilities of surface-to-air cloud-free lines-of-sight and low cloud statistics from ship observations. Part 1: Fifteen marine locations
[AD-A104633] N82-11730

LINE SPECTRA
Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968

LINEAR ACCELERATORS
Proton induction linacs as high-intensity neutron sources
[DE81-025825] N82-11878
Heavy ion fusion program at Argonne
[DE81-023905] N82-11902

LINEAR EQUATIONS
Linear evolution equations of hyperbolic type in a locally convex space N82-11850
Theory of electron cyclotron heating in the Constance 2 experiment
[DE81-028269] N82-11906

LINEAR PROGRAMMING
An optimization model for energy generation and distribution in a dynamic facility N82-11310

LINEAR SYSTEMS
Theory of stochastic optimal control some basic notions N82-11075
Nonparametric identification of a class of nonlinear close-coupled dynamic systems
[NASA-CR-164948] N82-11098
Closed form evaluation of symmetric two-sided complex integrals N82-11299
Mathematical investigation of linear control systems containing input derivatives N82-11819
Linear and nonlinear theory study of Alpha Virginis
[DE81-025335] N82-12006
A self-consistent linear-mode analysis of a stellar convection zone N82-12008

LINEARITY
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508

LINGUISTICS
Elements of programming linguistics. Part 1: The lambda calculus and its implementation
[AD-A104345] N82-11805

LININGS
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663

LIQUID CHROMATOGRAPHY
Development and optimization of methodologies for analysis of complex hydrocarbon mixtures
[DE81-025875] N82-11114
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-029125] N82-11166

LIQUID FLOW
Directional flow sensor
[NASA-CASE-FRC-11074-1] N82-11436
LIQUID FUELS
Catalyst and reactor development for a liguid-phase Fischer-Tropsch process
[DE81-028209] N82-11168
LIQUID INJECTION
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
LIQUID METALS
Liquid and solid metal embrittlement
[AD-A103048] N82-11187
LIQUID OXYGEN
Liquid oxygen turbopump technology
[NASA-CR-165487] N82-11468
LIQUID PHASE EPITAXY
InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452
LIQUID PHASES
Electron attachment as a probe of photoionization processes in liquid media --- pyrene
[DE81-026352] N82-11163
LIQUID-SOLID INTERFACES
Liquid and solid metal embrittlement
[AD-A103048] N82-11187
LISP (PROGRAMMING LANGUAGE)
Elements of programming linguistics. Part 1: The lambda calculus and its implementation
[AD-A104345] N82-11805
LITHIUM
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927
LITHIUM SULFUR BATTERIES
Investigation of Lithium Sulfur Dioxide (Li/SO2) battery safety hazard
[AD-A104326] N82-11552
Lithium/iron sulfide cell development for electric-vehicle propulsion
[DE81-023570] N82-11996
LITHOLOGY
Geologic considerations in underground coal mining system design
[NASA-CR-164961] N82-11516
LITHOSPHERE
Study of the time evolution of the lithosphere
[NASA-CR-164968] N82-11696
LITTORAL DRIFT
Critical wave conditions for sand motion initiation
[AD-A104376] N82-11400
LOADS (FORCES)
Stochastic models for dependent load processes
[PB81-219735] N82-11327
LOGIC CIRCUITS
Logic-controlled occlusive cuff system
[NASA-CASE-MSC-14836-1] N82-11770
LONG TERM EFFECTS
Stress relaxation of cellular silicone material: 1981
[DE81-030692] N82-11137
Evaluation of the effects of solar radiation on glasses
[NASA-CR-161907] N82-11207
Survey on aging on electrodes and electrocatalysts in phosphoric acid fuel cells
[NASA-CR-165505] N82-11545
Long-term performance of the Hunn passive solar residence
[DE81-028735] N82-11600
Cyclic nucleotides in tissues during long-term hypokinesia
[NASA-TM-76726] N82-11757
LOUVERS
Three prototype designs for an exterior-mounted, interior-operated, movable insulation system
[DE81-025586] N82-11324
LOW COST
Low-cost solar flat-plate-collector development
[DE81-025081] N82-11584
LOW DENSITY FLOW
On the capacity of holographic phase-shift interferometric technique in the visualization of low density flows N82-12024
LOW NOISE
Low noise tuned amplifier
[NASA-CASE-GSC-12567-1] N82-11359
LOW SPEED STABILITY
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
LOW TEMPERATURE ENVIRONMENTS
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224
LUBRICATION
Thermal and chemical effects in high pressure rolling/sliding contacts
[AD-A104473] N82-11471
LUGS
Strength behaviour of fatigue cracked lugs --- stress intensity and crack propagation characteristics
[RAE-LIB-TRANS-2057] N82-11486
LUMINAIRES
The effects of gaseous atmospheres on the performance characteristics of aluminum-sodium nitrate flares
[AD-A104383] N82-11227
LUNAR EXPLORATION
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989
LYMPHOCYTES
Human lymphocyte calcium metabolism N82-11769

M

MACH NUMBER
Wind tunnel supplementary Mach number minimum section insert
[NASA-CASE-LAR-12532-1] N82-11088
MACH-ZEHNDER INTERFEROMETERS
Detection of ultrasonic waves in solids by an optical fiber interferometer N82-11123
MACHINE TOOLS
Digital control of machine tools
[DE81-029950] N82-11476
MAG .2SIUM
Interface reactions in Mg/Zn3P2 solar cells
[DE81-025773] N82-11597
MAGNESIUM ALLOYS
Fatigue characteristics and microstructural analysis of thermomechanically-processed, high-magnesium aluminum-magnesium alloy
[AD-A104589] N82-11189
MAGNESIUM COMPOUNDS
The storage of hydrogen in the form of metal hydrides: An application to thermal engines
[NASA-TM-76609] N82-11225
MAGNET COILS
High-voltage air-core pulse transformers
[DE81-030999] N82-11370
MAGNETIC CONTROL
Low temperature latching solenoid
[NASA-CASE-MSC-18106-1] N82-11357
MAGNETIC EFFECTS
The hydrogen atom in a strong uniform magnetic field N82-11866
MAGNETIC FIELD CONFIGURATIONS
Magnetic fusion energy program, volume 1
[SAI-254-80-656-LJ-VOL-1] N82-11955
Magnetic fusion energy program, volume 2
[SAI-254-80-656-LJ-VOL-2] N82-11956
MAGNETIC FIELDS
Electromagnetic field mapping of cylinder and missile nosecone
[AD-A104312] N82-11104
Detection of vibrations in metallic structures using small passive magnetic fields
[AD-A104405] N82-11495
The hydrogen atom in a strong uniform magnetic field N82-11866
Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888
MAGNETIC FLUX
Energy losses in conductors carrying very high currents
[DE81-025367] N82-11373
Stability of permanent-magnet parameters
[DE81-027013] N82-11852
MAGNETIC INDUCTION
Geomagnetic observations N82-11693
MAGNETIC MATERIALS
Application of a rare-earth cobalt magnet to synchronous motors
[NAL-TR-656] N82-11358
MAGNETIC MEASUREMENT
Magnetic Field Satellite (Magsat) data processing system specifications
[NASA-CR-166737] N82-11103
The piezomagnetic effect: Limits on detectability using a combined vector and scalar magnetometer array N82-11430
MAGNETIC MIRRORS
Plasma confinement in the TMX tandem mirror
[UCRL-85883] N82-11939
Magnets for the Tandem Mirror Fusion Power Reactor WITAMIR-I
[DE81-025568] N82-11954
Magnetic fusion energy program, volume 1
[SAI-254-80-656-LJ-VOL-1] N82-11955
Magnetic fusion energy program, volume 2
[SAI-254-80-656-LJ-VOL-2] N82-11956
MAGNETIC PROPERTIES
Magnetic bearings
[DE81-024201] N82-11473
A review of an attempt to create shatter cones with magnetic flyer plate technology
[NASA-CR-164614] N82-11492
MAGNETIC SUSPENSION
Stirling cycle cryogenic cooler --- magnetically suspended pistons
[NASA-CASE-GSC-12697-1] N82-11312
MAGNETO-OPTICS
Magneto-optically modulated CH3OH laser for Faraday rotation measurements in Tokamaks
[DE81-027298] N82-11462
MAGNETOHYDRODYNAMIC FLOW
Finite temperature relativistic magnetohydrodynamic winds N82-11923
MAGNETOHYDRODYNAMIC GENERATORS
One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158
Mass spectrometric studies of MHD slag thermochemistry
[PB81-221434] N82-11173
Magnetohydrodynamic research program of the MHD Energy center at Mississippi State University and structural features of MHD radiant boilers
[DE81-029901] N82-11934
Development, testing, and evaluation of MHD materials and component designs. Volume 1: Executive summary
[DE81-026203] N82-11947
MAGNETOHYDRODYNAMIC STABILITY
Report of laser activities: 1978 - 1979
[DE81-026997] N82-11459
Theory of drift instabilities and the associated anomalous transport
[IPPJ-REV-1] N82-11924
An energy integral and variational principle for plasma kinetic modes
[IPPJ-531] N82-11926
MAGNETOHYDRODYNAMICS
Finite temperature relativistic magnetohydrodynamic winds N82-11923
One-dimensional magnetohydrodynamic calculations of a hydrogen-gas puff
[UCRL-85867] N82-11940
MAGNETOMETERS
Magnetic Field Investigation for ISEE mother and daughter spacecraft --- magnetometer design, capability, and results
[NASA-CR-166713] N82-11105
The piezomagnetic effect: Limits on detectability using a combined vector and scalar magnetometer array N82-11430
MAGNETOPAUSE
Magnetic Field Investigation for ISEE mother and daughter spacecraft --- magnetometer design, capability, and results
[NASA-CR-166713] N82-11105
MAGNETOSPHERE
Geomagnetic observations N82-11693
Imperfect magnetosphere-ionosphere coupling and discrete auroras
[AD-A104509] N82-11699
MAGNETRONS
Trajectory analysis of the electrons in a magnetron-type gun
[DE81-027860] N82-11905

MAGNETS
Application of a rare-earth cobalt magnet to synchronous motors
[NAL-TR-656] N82-11358
Stability of permanent-magnet parameters
[DE81-027013] N82-11852
Magnets for the Tandem Mirror Fusion Power Reactor WITAMIR-I
[DE81-025568] N82-11954

MAINE
Water resources data for Maine, water year 1980
[PB81-226789] N82-11541

MAINTAINABILITY
Analysis of 4&5 data — program evaluation
[AD-A104249] N82-11804

MAINTENANCE
Rehabilitation of 64-meter-antenna radial bearing
N82-11301
Networks consolidation program: Maintenance and Operations (M&O) staffing estimates N82-11303
Goldstone (GDSCC) administrative computing
N82-11306
Preventing large-battery explosions
[PB81-227373] N82-11628

MAN MACHINE SYSTEMS
NOCA upgrade N82-11304
Condition recognition for a program synthesizer
[AD-A104586] N82-11808
The individual versus the computer: An examination of attitude problems and their impact on system development
[AD-A104636] N82-11977

MANAGEMENT INFORMATION SYSTEMS
The individual versus the computer: An examination of attitude problems and their impact on system development
[AD-A104636] N82-11977

MANAGEMENT PLANNING
DSN model for use in strategic planning
N82-11284
Applying science and technology to improve local government productivity
[PB81-217986] N82-11978

MANGANESE ALLOYS
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76620] N82-11180

MANGANESE COMPOUNDS
Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics
[DE81-030423] N82-11218

MANIFOLDS (MATHEMATICS)
Homeomorphisms of some direct limit spaces
N82-11848

MANNED SPACE FLIGHT
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097

MANPOWER
Goldstone (GDSCC) administrative computing
N82-11306

MANUAL CONTROL
Control law design for transport aircraft flight tasks
N82-11080

MANUALS
Photovoltaic operations manual radio station WBNO
[DE81-027439] N82-11603

MANUFACTURING
The industrial processing of unidirectional fiber prepregs
[NASA-TM-76599] N82-11119
The effects of impurities on the performance of silicon solar cells
[NASA-CR-164945] N82-11548

MAPPING
Electromagnetic field mapping of cylinder and missile nosecone
[AD-A104312] N82-11104
Military geodesy and geospace science, unit three
[AD-A105072] N82-11711
Reflection/transmission phase shift interferometer and viewing optics
[DE81-027658] N82-11916
Search for optimal three-dimensional mapping of the solar corona from K-coronameter data
[PB81-222903] N82-12017

MARINE ENVIRONMENTS
Flaw growth of 7075, 7475, 7050 and 7049 aluminum alloy plate in stress corrosion environments: 4-year marine atmosphere results
[NASA-CR-161887] N82-11181

MARINE RESOURCES
The planning and management of California's coastal resources
[PB81-224057] N82-11670

MARKET RESEARCH
Three prototype designs for an exterior-mounted, interior-operated, movable insulation system
[DE81-025586] N82-11324
Irrigation market for solar thermal parabolic dish systems
[NASA-CR-164955] N82-11549
National coal-market conditions for the year 2000: Regional-issue identification and analysis, high scenario
[DE81-026425] N82-11988

MARKOV PROCESSES
A simulation analysis of the effectiveness of Markovian control and Bayesian control — cost analysis
[AD-A104635] N82-11840

MARSHLANDS
Nitrogen dynamics in a lagoon development and an adjacent salt marsh N82-11632

MARTENSITE
Microstructure and properties of dual-phase steels containing fine precipitates
[DE81-029946] N82-11192
Determination of exact orientation relationships between martensite and austenite in steels by microdiffraction
[LBL-12289] N82-11195

MASERS
Cryogenic filters for RFI protection N82-11293
Traveling-wave maser, closed cycle refrigerator automation N82-11294

MASS SPECTROMETERS
Soot formation in synfuels
[DE81-030273] N82-11164
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438
Design and fabrication of quadrupole ion mass spectrometer for upper atmosphere
[AD-A104319] N82-11705

MASS SPECTROSCOPY
Bragg curve spectroscopy
[DE81-025827] N82-11161
Mass spectrometry of the CO2 laser plasma
[AD-A104344] N82-11454
Intercomparison of techniques for the non-invasive measurement of bone mass
[DE81-029921] N82-11773
Molecular-beam system for the study of transient combustion processes
[DE81-030663] N82-11872

MASSACHUSETTS
Planning a comprehensive program for exploration of the anthracite deposits of the Narragansett Basin of Massachusetts and Rhode Island, phase 1 and 2
[DE81-028490] N82-11519
Exploration of coal and anthracitic carbonaceous shale resources, Narragansett Basin, Massachusetts, and Rhode Island
[DE81-030895] N82-11523

MATERIALS RECOVERY
Aluminum recovery from fly ash and shale-retort wastes
[DE81-027675] N82-11154
SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board
[DE81-903377] N82-11615

MATHEMATICAL MODELS
Technology base for icing instrumentation and mathematical modelling N82-11058
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148
Tennessee Valley Authority atmospheric fluidized-bed combustor simulation
[DE81-030262] N82-11151
Vertical combustor for refuse combustion
[DE81-030002] N82-11152
Numerical model study of burning and detonation in small PETN-loaded assemblies
[DE81-028594] N82-11162
Trap activation model for hydrogen retention and isotope exchange in some refractory materials
[DE81-025995] N82-11221
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
LLNL underground coal gasification project
[DE81-030634] N82-11267
DSN model for use in strategic planning
N82-11284
Minimizing the time to troubleshoot a failed system
N82-11296
Stochastic models for dependent load processes
[PB81-219735] N82-11327
Determination of the spectra of modulated pulse trains by the spectral function method
[RAE-LIB-TRANS-2058] N82-11335
Antenna pattern modification for single reflector antennas — smoothing data from scanning microwave radiometers
[NASA-CR-166711] N82-11338
Superconducting proximity effect for in situ and model layered systems
[DE81-025530] N82-11372
Modeling and elimination of latch-up in bulk CMOS integrated circuits
[DE81-017413] N82-11377
Three-dimensional lee waves in a continuously stratified fluid N82-11387
Some problems in the calculation of flows with tangential discontinuities
[RAE-LIB-TRANS-2059] N82-11389
Surface-tension induced instabilities: Effects of lateral boundaries
[NASA-CR-165530] N82-11390
A three-dimensional simulation of transition and early turbulence in a time-developing mixing layer
[NASA-CR-164942] N82-11393
Higher-level simulations of turbulent flows
[NASA-CR-164936] N82-11395
Diffusivity of particles moving rapidly through a turbulent fluid
[DE81-030414] N82-11408
Stefan problem with a convective boundary condition
[DE81-030424] N82-11410
Mean values and an inverse problem for porous media flow
[DE81-027210] N82-11411
Conduct a state-of-the-art survey of existing knowledge for the design of ground-source heat pumps
[DE81-024084] N82-11420
Heat pump R and D at Oak Ridge National Laboratory
[DE81-024121] N82-11422
Calibration of a laminar flowmeter
[DE81-024423] N82-11442
Fatigue initiation at a high or low number of cycles
[RAE-LIB-TRANS-2056] N82-11487
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498
A model describing the microwave emission from a multi-layer snowpack at 37 GHz
[NASA-CR-166708] N82-11510
Irrigation market for solar thermal parabolic dish systems
[NASA-CR-164955] N82-11549
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566
Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568

Study of photovoltaic cost elements. Volume 5: Installation cost model for intermediate PV systems: Users manual
[DE81-030981] N82-11569
Analysis of solar desiccant systems and concepts
[DE81-023027] N82-11612
USSR report. Life sciences biomedical and behavioral sciences, no. 12
[JPRS-79338] N82-11762
Time and information model of human Memory Organization N82-11763
Physics in few dimensions --- condensed matter physics
[DE81-026054] N82-11853
Constitutive modelling for the shock physicist
[DE81-024063] N82-11854
An electrostatic model for energies of molecules in solution N82-11869
Uncertainty analysis for geologic disposal of radioactive waste
[DE81-027206] N82-11893
Polishing-to-figuring transition in turned optics
[DE81-028691] N82-11917
RF-driven Tokamak reactor with sub-ignited, thermally stable operation
[DE81-029437] N82-11935
Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres
[NASA-CR-164930] N82-12010
A model of the normal and null states of pulsars
[PB81-215907] N82-12011
Radiative transfer in cometary dust atmospheres: Critique of recent developments
[NASA-CR-164946] N82-12015

MATRICES (MATHEMATICS)
Mathematical investigation of linear control systems containing input derivatives N82-11819
On permanents and diagonal products of doubly stochastic matrices N82-11832

MAXIMA
A general moment inequality for the maximum of rectangular partial sums of multiple series
[AD-A104475] N82-11828

MAXIMUM ENTROPY METHOD
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925
Maximal entropy in fluid and plasma turbulence: A review
[DE81-025388] N82-11946

MAXIMUM LIKELIHOOD ESTIMATES
A note on a nonparametric maximum penalized likelihood estimator of the probability density function of a positive random variable. AMPLE with positive support
[AD-A104476] N82-11836

MEAN
Properties of batch means from stationary ARMA (1, 1) time series
[AD-A104245] N82-11839

MEASURING INSTRUMENTS
Technology base for icing instrumentation and mathematical modelling N82-11058
A ground-motion displacement gauge
[AD-A104325] N82-11437
Performance assessments of precipitation gages for snow measurement
[PB81-218547] N82-11443

MECHANICAL DEVICES
Clamp-mount device
[NASA-CASE-MFS-25510-1] N82-11470

MECHANICAL ENGINEERING
Research in nonlinear structural and solid mechanics
[NASA-CP-2147-SUPPL] N82-11489
Space shuttle main engine controller
[NASA-TP-1932] N82-11784

MECHANICAL IMPEDANCE
Mechanical impedance of the human outer ear
[RAE-LIB-TRANS-2065] N82-11767

MELTING POINTS
Monte Carlo calculations of the melting point of iron at core pressures N82-11681

MELTS (CRYSTAL GROWTH)
Space processing of electronic materials --- determining ther themal conductivity of mercury cadmium tellurides and furnace design
[NASA-CR-161892] N82-11094
Growth of solid solution single crystals --- mercury cadmium tellurides
[NASA-CR-161891] N82-11958

MEMORY
USSR report. Life sciences biomedical and behavioral sciences, no. 12
[JPRS-79338] N82-11762
Time and information model of human Memory Organization N82-11763

MERCURY (PLANET)
Planetary radar N82-11309

MERCURY CADMIUM TELLURIDES
Space processing of electronic materials --- determining ther themal conductivity of mercury cadmium tellurides and furnace design
[NASA-CR-161892] N82-11094
Growth of solid solution single crystals --- mercury cadmium tellurides
[NASA-CR-161891] N82-11958

MERIDIONAL FLOW
Meridional heat transport at the onset of winter stratospheric warming
[NASA-TM-76614] N82-11697

MESOSCALE PHENOMENA
An assessment of detecting mesoscale rainfall from mid-latitude cyclones using GOES imagery data
[AD-A104377] N82-11726
Hawaii mesoscale energy and climate project (HAMEC). 2: P-3 aircraft data sets
[PB81-224198] N82-11747

METABOLISM
Hydrogen production from the photosynthetic bacterium Rhodopseudomonas sphaeroides
[DE81-025831] N82-11256

METAL BONDING
Aluminum ion-containing polyimide adhesives
[NASA-CASE-LAR-12640-1] N82-11206

METAL COATINGS
Coated-limiter testing in Tokamaks
[DE81-027665] N82-11951

METAL CRYSTALS
Liquid and solid metal embrittlement
[AD-A103048] N82-11187

METAL FATIGUE
Fatigue characteristics and microstructural analysis of thermomechanically-processed, high-magnesium aluminum-magnesium alloy
[AD-A104589] N82-11189
Electrochemical conditions within stress corrosion cracks (experimental techniques)
[AD-A104246] N82-11497

METAL HYDRIDES
Hydride chemical compressor, phase 1
[DE81-030199] N82-11155
Technical and economic aspects of hydrogen storage in metal hydrides
[NASA-TM-76610] N82-11223
The storage of hydrogen in the form of metal hydrides: An application to thermal engines
[NASA-TM-76609] N82-11225

METAL IONS
Aluminum ion-containing polyimide adhesives
[NASA-CASE-LAR-12640-1] N82-11206

METAL MATRIX COMPOSITES
Thermal expansion of metal matrix composites --- acousto-optic study of microcracks and temperature measurement
[AD-A104680] N82-11134
Comparison of costs for solidification of high-level radioactive waste solutions: Glass monoliths vs. metal matrices
[ANL-80-121] N82-11890

METAL PLATES
Flaw growth of 7075, 7475, 7050 and 7049 aluminum alloy plate in stress corrosion environments: 4-year marine atmosphere results
[NASA-CR-161887] N82-11181
Eddy current flows around cracks in thin plates for nondestructive testing
[AD-A104407] N82-11481

METAL SURFACES
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183
Deposition and corrosion phenomena on aluminum surfaces under deluged dry cooling-tower conditions
[DE81-025483] N82-11193
Adsorption of hydrogen on iron and the hydrogen embrittlement of steel
[DE81-025164] N82-11196
Trapping and surface permeation of deuterium in Fe, Ni and stainless steel: An ion-beam study
[DE81-023303] N82-11201
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967

METAL VAPOR LASERS
Characteristics of pulse gold vapor lasor outlined N82-11450

METAL VAPORS
Selected studies of four high-temperature air-pollution sources N82-11680

METALLIC GLASSES
Application of solidification theory to rapid solidification processing --- alloys and metallic glasses
[AD-A104561] N82-11214

METEOROIDS
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989

METEOROLOGICAL PARAMETERS
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Operational environment, meteorological conditions and weather forecasting N82-11057
Data collection and processing for the ACES --- annual cycle energy system demonstration house
[DE81-030630] N82-11555
An open-ocean marine fog development and forecast model for Ocean Weather Station Papa
[AD-A104595] N82-11729
US Monsoon Experiment MONEX rawinsonde/radiometersonde system
[PB81-222937] N82-11736
The determination of navigational and meteorological variables measured by NOAA/RFC WP3D aircraft
[PB81-225468] N82-11743

METEOROLOGICAL RADAR
Doppler radar data analysis during fiscal year 1980
[PB81-225476] N82-11742

METEOROLOGICAL SERVICES
A systems approach to the real-time runoff analysis with a deterministic rainfall-runoff model
[PB81-224495] N82-11530

METEOROLOGY
National Center for Atmospheric Research
[NCAR/AR-80] N82-11692
Report on research at AFGL
[AD-A104513] N82-11704

METHANATION
Advanced system experimental facility: Solid waste to methane gas. Background and process description
[DE81-030198] N82-11244

METHANE
Response of portable VOC analyzers to chemical mixtures
[PB81-254262] N82-11176
Production and utilization of methane from anaerobic sludge digestion in U.S. wastewater-treatment plants
[DE81-029958] N82-11246
Identification of geopressured occurrences outside of the Gulf Coast
[DE81-025511] N82-11522

METHODOLOGY
Writing effective reports
[PB81-214645] N82-11983

METHOXY SYSTEMS
Epitaxial morphologies and deposition energetics of polyoxymethylene N82-11204

METHYLENE
Physical studies of aromatic methylenes N82-11113
Coal hydrogenation via bonding of metallic compounds to coal, part 1. Solubilization of Illinois bituminous coal - the critical importance of methylene group cleavage, part 2
[DE81-027562] N82-11236

MEXICO
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas --- Texas and Northern Chihuahua, Mexico
[NASA-CR-164964] N82-11695

MICHIGAN
Project demonstration of wind-turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE81-030950] N82-11380
Water resources data for Michigan, water year 1980
[PB81-224180] N82-11527
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534

MICROANALYSIS
Submicron-particle absorption spectroscopy by photothermal modulation of MIE scattered light
[DE81-025096] N82-11160
Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177

MICROCOMPUTERS
Microcomputer-controlled communication network for Sandia National Laboratories' environmental test chambers
[DE81-030988] N82-11355
A microprocessor development system for the ALTOS series microcomputers
[AD-A104624] N82-11793

MICROCRACKS
Thermal expansion of metal matrix composites --- acousto-optic study of microcracks and temperature measurement
[AD-A104680] N82-11134

MICROELECTRONICS
Manufacturing methods and technology engineering for tape chip carrier
[AD-A104393] N82-11365

MICROFIBERS
Small conductive particle sensor --- microfiber size determination
[NASA-CASE-LAR-12552-1] N82-11431

MICROFILMS
Microfiche as a vehicle for technical reports
[PB81-228009] N82-11986

MICROPROCESSORS
Digital control of machine tools
[DE81-029950] N82-11476
Automatic multi-banking of memory for microprocessors
[NASA-CASE-NPO-15295-1] N82-11785
Fidelity optimization of microprocessor system simulations
[AD-A104679] N82-11786
A microprocessor development system for the ALTOS series microcomputers
[AD-A104624] N82-11793
Use of microprocessors in a neutrino experiment
[DE81-026057] N82-11875

MICROSTRIP TRANSMISSION LINES
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336

MICROSTRUCTURE
The quantitative determination of non-metallic inclusions by a mathematical statistical method
[RAE-LIB-TRANS-2066] N82-11179
Fatigue characteristics and microstructural analysis of thermomechanically-processed, high-magnesium aluminum-magnesium alloy
[AD-A104589] N82-11189
Microstructure and properties of dual-phase steels containing fine precipitates
[DE81-029946] N82-11192
Microstructure of amorphous and semi-crystalline polymers
[AD-A102853] N82-11216
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220

MICROWAVE ANTENNAS
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336

MICROWAVE EMISSION
A model describing the microwave emission from a multi-layer snowpack at 37 GHz
[NASA-CR-166708] N82-11510

MICROWAVE FREQUENCIES
Strategies for weather-dependent data acquisition N82-11286

MICROWAVE RADIOMETERS
Antenna pattern modification for single reflector antennas --- smoothing data from scanning microwave radiometers
[NASA-CR-166711] N82-11338

MICROWAVE SENSORS
Technology transfer of NASA microwave remote sensing system
[NASA-CR-165791] N82-11515

MICROWAVE TRANSMISSION
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
Cryogenic filters for RFI protection N82-11293
Investigation of direct solar-to-microwave energy conversion techniques
[NASA-CR-161883] N82-11544

MIDLATITUDE ATMOSPHERE
Numerical simulation of the dynamics, cloud microphysics and radar echo structures of tropical and mid-latitude convection N82-11722

MIE SCATTERING
Submicron-particle absorption spectroscopy by photothermal modulation of MIE scattered light
[DE81-025096] N82-11160
Light scattering by bubbles in liquids or in glass
[AD-A104241] N82-11912

MILITARY HELICOPTERS
Conceptual design of a computer-generated topographic display system to aid mission planning and mission conduct by Army aviators
[AD-A104388] N82-11517

MILITARY SPACECRAFT
Military space doctrine: The great frontier
[AD-A104574] N82-11990

MILITARY TECHNOLOGY
Military geodesy and geospace science, unit three
[AD-A105072] N82-11711
Military space doctrine: The great frontier
[AD-A104574] N82-11990

MILK
Ethanol production in southern tier east region of New York: Technical and economic feasibility
[PB81-226979] N82-11275

MINERAL DEPOSITS
Geology of the nahcolite deposits and associated oil shales of the Green River Formation in the Piceance Creek Basin, Colorado N82-11683

MINERAL EXPLORATION
Planning a comprehensive program for exploration of the anthracite deposits of the Narragansett Basin of Massachusetts and Rhode Island, phase 1 and 2
[DE81-028490] N82-11519

MINERAL METABOLISM
Intercomparison of techniques for the non-invasive measurement of bone mass
[DE81-029921] N82-11773
Ozone exposure and pulmonary metabolic effects of mediators and hormones
[PB81-222408] N82-11779

MINES (EXCAVATIONS)
Use of a vegetative filter zone to control fine-grained sediments from surface mines
[PB81-226110] N82-11674
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE81-027131] N82-11712

MINIATURE ELECTRONIC EQUIPMENT
Tooling for electrochemical deburring
[DE81-030190] N82-11475

MINIATURIZATION
Microstructures for high-energy X-ray and particle-imaging applications
[DE81-026531] N82-11899

MINING
Geologic considerations in underground coal mining system design
[NASA-CR-164961] N82-11516
Coal mine hazard detection using synthetic pulse radar
[PB81-224412] N82-11538
Energy analysis of human ecosystems in an Appalachian coal county
[DE81-025177] N82-11574
Recommended guidelines for oxygen self-rescuers. Volume 1: Underground coal mining
[PB81-225872] N82-11782
Recommended guidelines for oxygen self-rescuers. Volume 2: Appendices
[PB81-225880] N82-11783

MINKOWSKI SPACE
Classical field theory with Z(3) symmetry
[DE81-027089] N82-11969

MIRROR FUSION
Theory of electron cyclotron heating in the Constance 2 experiment
[DE81-028269] N82-11906
Plasma confinement in the TMX tandem mirror
[UCRL-85883] N82-11939

MIRRORS
Fracture mechanics of cellular glass
[NASA-CR-164959] N82-11209
Secondary and compound concentrators for parabolic dish solar thermal power systems
[NASA-CR-164960] N82-11550
Heliostat operation at the central receiver test facility (1978 - 1980)
[DE81-031926] N82-11556

MIS (SEMICONDUCTORS)
Low temperature growth and electrical characterization of insulators for GaAs MISFETS
[NASA-CR-164972] N82-11959

MISSILE CONTROL
Application of optimal control techniques to tactical missile guidance N82-11086

MISSILE DESIGN
Outsider's look at flight instrumentation
[DE81-025409] N82-11066

MISSION PLANNING
A proposed new policy for planetary protection
[NASA-CR-164947] N82-11095

MISSOURI RIVER (US)
Synthetic fuel development for the Upper Missouri River Basin. Section 13: Water assessment report
[PB81-224537] N82-11276

MIXING
Effects of planform geometry on tidal flushing and mixing in Marinas
[PB81-219537] N82-11660
Airway gas mixing during rest and bicycle exercise N82-11768

MIXING CIRCUITS
Large gain, negative resistance, and oscillations in superconducting quasiparticle heterodyne mixers
[AD-A104534] N82-11361

MIXTURES
Development and optimization of methodologies for analysis of complex hydrocarbon mixtures
[DE81-025875] N82-11114

MODAL RESPONSE
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 1: Investigation of resonance extraction procedures --- for target recognition
[AD-A104530] N82-11350
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 2: Appendices --- for target recognition
[AD-A104531] N82-11351
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 3: Translation of Prony's method --- for target recognition
[AD-A104532] N82-11352
Advanced superposition methods for high speed turbopump vibration analysis
[NASA-CR-165379] N82-11465
Modal analysis using a Fourier analyzer, curve-fitting, and modal tuning
[NASA-CR-161886] N82-11490
On-line failure detection of vibrating structures
[UCRL-86099] N82-11505

MODEMS
Symbol error rate performance evaluation of the LM37 multimegabit telemetry modulator-demodulator unit N82-11289

MODULATION
Magneto-optically modulated CH3OH laser for Faraday rotation measurements in Tokamaks
[DE81-027298] N82-11462

MODULATION TRANSFER FUNCTION
Modulation/demodulation techniques for satellite communications. Part 4: Appendices
[NASA-CR-164954] N82-11341

MODULUS OF ELASTICITY
Quasi-elastic high-pressure waves in 2024 Al and Cu
[DE81-025334] N82-11971

MOIRE FRINGES
Dynamic Moire methods for detection of loosened space shuttle tiles
[NASA-TM-83205] N82-11434

MOISTURE CONTENT
Semiconductor measurement technology ARPA/NBS Workshop Moisture Measurement Technology for Hermetic Semiconductor Devices
[PB81-220733] N82-11384

MOLDS
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067

MOLECULAR BEAM EPITAXY
Development of MBE grown Pb-salt semiconductor lasers for the 8.0 to 15.0 micrometer spectral region
[NASA-CR-165683] N82-11453

MOLECULAR BEAMS
Molecular-beam system for the study of transient combustion processes
[DE81-030663] N82-11872
Use of molecular beams to support microspheres during plasma coating
[DE81-025601] N82-11873

MOLECULAR CLOUDS
Observations of molecular clouds containing reflection nebulae N82-11999

MOLECULAR ENERGY LEVELS
An electrostatic model for energies of molecules in solution N82-11869

MOLECULAR EXCITATION
Vibrational sensitization of of 14N14NO, 15N14NO and H2O by laser excited SF6 N82-11143
Stimulated Raman studies of CO2-laser-excited SF6
[DE81-025829] N82-11463

MOLECULAR FLOW
Molecular spectroscopy and relaxation in supersonic beams N82-11867

MOLECULAR IONS
Role of excited states of molecular ions in structure studies with high-energy collisions
[DE81-023898] N82-11881

MOLECULAR ORBITALS
Physical studies of aromatic methylenes N82-11113
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927

MOLECULAR SPECTROSCOPY
Molecular spectroscopy and relaxation in supersonic beams N82-11867

MOLECULAR STRUCTURE
A structural study of aluminosilicate glasses by Raman spectroscopy N82-11138
Soot formation in synfuels
[DE81-030273] N82-11164
Effects of ionizing radiation on the chemical structure, crystalline content and molecular weight distribution of various Teflon resins N82-11203
Vibrational spectra and atom-atom potentials in the crystalline state. 1: A comparison of hexasulfur, octasulfur and dodecasulfur. 2: A study of solid allene N82-11957

MOLTEN SALT ELECTROLYTES
Rechargeable molten-salt cells
[DE81-027091] N82-11595

MOLYBDENUM
Statistical versus valence neutron neutron capture in Mo-98
[DE81-023943] N82-11880
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900

MOMENTS
A general moment inequality for the maximum of rectangular partial sums of multiple series
[AD-A104475] N82-11828

MONITORS
Automated water monitor system field demonstration test report. Volume 1: Executive summary
[NASA-CR-166228] N82-11991
Automated water monitor system field demonstration test report. Volume 2: Technical summary
[NASA-CR-166229] N82-11992

MONOCHROMATIC RADIATION
Application of visible monochromatic auroral imaging data for modeling infrared Earth-limb morphology
[AD-A104343] N82-11706

MONOMOLECULAR FILMS
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967

MONTE CARLO METHOD
Monte Carlo calculations of the melting point of iron at core pressures N82-11681
Validation of a Monte Carlo simulation of binary time series
[AD-A104525] N82-11838
Bounded limit for the Monte Carlo point-flux-estimator
[DE81-026526] N82-11883
M-alpha emission from a disk in the close binary U Cephei: A Monte Carlo simulation N82-12001

MOON
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989

MORPHOLOGY
Application of visible monochromatic auroral imaging data for modeling infrared Earth-limb morphology
[AD-A104343] N82-11706

MOUNTING
Clamp-mount device
[NASA-CASE-MFS-25510-1] N82-11470

MULTICHANNEL COMMUNICATION
Multiaccess of a slotted channel by finitely many users
[AD-A104417] N82-11349

MULTIPLICATION
On permanents and diagonal products of doubly stochastic matrices N82-11832

MULTIPOLES
Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888

MULTIPROCESSING (COMPUTERS)
Distributed computation of fixed points
[AD-A104418] N82-11791

MULTISPECTRAL PHOTOGRAPHY
Identification of lithologic units using multichannel imaging systems N82-11509

MULTIVARIATE STATISTICAL ANALYSIS
Methods for presentation and display of multivariate data
[NASA-CR-165788] N82-11833
Projection pursuit methods for data analysis
[DE81-027493] N82-11842

MUONS
Elastic and inelastic psi production by muons
[DE81-025326] N82-11877

MUSCULAR FUNCTION
Electron microscopical and histochemical studies on the transverse striated muscles of birds after prolonged hypokinesis
[NASA-TM-76717] N82-11759

N

N-TYPE SEMICONDUCTORS
A study of metal-semiconductor contacts on indium phosphide
[AD-A104439] N82-11965

NACELLES
Low speed testing of the inlets designed for a tamden-fan V/STOL nacelle --- conducted in the Lewis 10 by 10 foot wind tunnel
[NASA-TM-82728] N82-11042

NASA PROGRAMS
Lewis Research Center's coal-fired, pressurized, fluidized-bed reactor test facility
[NASA-TM-81616] N82-11397
NASA Patent Abstracts bibliography: A continuing bibliography, section 1, abstracts. Supplement 19
[NASA-SP-7039(19)-SEC-1] N82-11981
NASA Patent Abstracts Bibliography: A continuing bibliography, section 2, indexes. Supplement 19
[NASA-SP-7039(19)-SEC-2] N82-11982

NASCOM NETWORK
DSN ground communication facility N82-11282

NATURAL GAS
Brayton/Rankine 10-ton gas-fired space conditioning system, phase 2
[PB81-223372] N82-11478
Petroleum geology and resource assessment of the middle Caspian Basin, USSR, with special emphasis on the Uzen field
[DE81-029951] N82-11518
Environmental research plan for gas supply technologies. Volume 1: Executive summary
[PB81-222309] N82-11657

NATURAL GAS EXPLORATION
Identification of geopressured occurrences outside of the Gulf Coast
[DE81-025511] N82-11522
Sulfur pollution control. Phase 1: The disposal program (sections 5 through 7)
[PB81-222804] N82-11655

NAVIER-STOKES EQUATION
Some observations on a new numerical method for solving Navier-Stokes equations
[NASA-TP-1934] N82-11032
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
A computer solution to the stationary Navier-Stokes equations in two dimensions with proven convergence
[NASA-TM-81300] N82-11398

NAVIGATION
Flight trajectory control investigation
[AD-A104542] N82-11048
An overview of optimal control in aerospace systems N82-11074
The determination of navigational and meteorological variables measured by NOAA/RFC WP3D aircraft
[PB81-225468] N82-11743

NAVIGATION AIDS
The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739

NEBULAE
Observations of molecular clouds containing reflection nebulae N82-11999
Photoelectric surface brightness observations and the geometry of reflection nebulae N82-12002

NEGATIVE RESISTANCE CIRCUITS
Large gain, negative resistance, and oscillations in superconducting quasiparticle heterodyne mixers
[AD-A104534] N82-11361

NEPHANALYSIS
An analysis of cloud property retrieval using infrared sounder data
[PB81-221608] N82-11732

NETWORK ANALYSIS
Projected Newton methods and optimization of multicommodity flows
[AD-A104419] N82-11844

NETWORK CONTROL
Concept for a power system controller for large space electrical power systems
[NASA-TP-1939] N82-11109

NEUTRAL BEAMS
Electron-temperature requiremernts for neutralized inertial-confinement-fusion light-ion beams
[DE81-025352] N82-11884
Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888
Boosting up of neutral beam heating power by slowly rising toroidal field --- compression
[IPPJ-534] N82-11929

NEUTRALIZERS
Particle trajectories in a model electric field 1 --- neutralizing spacecraft surfaces
[AD-A104507] N82-11870

NEUTRINOS
Use of microprocessors in a neutrino experiment
[DE81-026057] N82-11875

NEUTRON ACTIVATION ANALYSIS
Mechanistic analysis of loft pulsed neutron activation data --- pipe flow velocity
[DE81-027124] N82-11876
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900

NEUTRON BEAMS
Proton induction linacs as high-intensity neutron sources
[DE81-025825] N82-11878

NEUTRON CROSS SECTIONS
Improved calculations of energy deposition from fast neutrons
[DE81-025385] N82-11885

NEUTRON DISTRIBUTION
Statistical versus valence neutron neutron capture in Mo-98
[DE81-023943] N82-11880
NEUTRON IRRADIATION
Improved calculations of energy deposition from fast neutrons
[DE81-025385] N82-11885
NEUTRON SOURCES
Proton induction linacs as high-intensity neutron sources
[DE81-025825] N82-11878
Source-to-incident-flux relation in a Tokamak blanket module
[DE81-026524] N82-11941
NEUTRONS
Calculation procedures for the analysis of integral experiments for fusion-reactor design
[DE81-027626] N82-11949
NEVADA
Principal facts, accuracies, sources, base station descriptions, and plots for 1380 gravity stations in the Tonopah 1 deg by 2 deg Quadrangle, Nevada
[PB81-219081] N82-11716
NEW HAMPSHIRE
New Hampshire and Vermont point source inventory update for NECRMP
[PB81-219339] N82-11672
NEW YORK
Ethanol production in southern tier east region of New York: Technical and economic feasibility
[PB81-226979] N82-11275
Flow routing in the Susquehanna River Basin: Part 4 - routing reservoir releases in the eastern Susquehanna River Basin in New York State
[PB81-221533] N82-11533
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669
NICKEL ALLOYS
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76620] N82-11180
Irradiation-induced swelling in commercial alloys
[DE81-029755] N82-11191
Stability of permanent-magnet parameters
[DE81-027013] N82-11852
NICKEL COMPOUNDS
Certain physical properties of cobalt and nickel borides
[NASA-TM-76623] N82-11185
NICKEL STEELS
Effects of alloying on aging and hardening processes of steel with 20% nickel
[NASA-TM-76624] N82-11186
Crack arrest properties of a 9 percent nickel cryogenic steels
[PB81-227993] N82-11202
NICKEL ZINC BATTERIES
Investigation of the zinc electrode reaction --- nickel zinc batteries
[DE81-030221] N82-11368
Development of battery separator composites
[NASA-CR-165508] N82-11547
NIMBUS 7 SATELLITE
Development of the coastal zone color scanner for NIMBUS 7. Volume 1: Mission objectives and instrument description
[NASA-CR-166720-VOL-1] N82-11511
NIOBIUM
Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968
NITROGEN COMPOUNDS
Nitrogen dynamics in a lagoon development and an adjacent salt marsh N82-11632
NITROGEN OXIDES
Kinetics of NO/ sub x formation during early stages of pulverized-coal combustion
[DE81-029071] N82-11641
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654
NODES (STANDING WAVES)
System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861
NOISE (SOUND)
Quiet bearing surface characterization
[AD-A104412] N82-11472
NOISE MEASUREMENT
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860
NOISE POLLUTION
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636
NOISE PREDICTION (AIRCRAFT)
Helicopter rotor trailing edge noise --- noise prediction
[NASA-CR-3470] N82-11859
NOISE REDUCTION
Handbook for industrial noise control
[NASA-SP-5108] N82-11858
NOISE SPECTRA
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860
Dislocation induced noises in semiconductors at low and high temperatures
[AD-A104449] N82-11960
NOISE TEMPERATURE
Surface resistivity measurements of candidate subreflector surfaces N82-11300
NONDESTRUCTIVE TESTS
Eddy current flows around cracks in thin plates for nondestructive testing
[AD-A104407] N82-11481
Detection of vibrations in metallic structures using small passive magnetic fields
[AD-A104405] N82-11495
Intercomparison of techniques for the non-invasive measurement of bone mass
[DE81-029921] N82-11773
Digital ultrasonics signal processing: Flaw data post processing use and description
[NASA-CR-161882] N82-11862
NONELECTROLYTES
The volumes and heat capacities of nonelectrolytes and organic electrolytes in methanol at 25 C N82-11142
NONEQUILIBRIUM THERMODYNAMICS
Is geothermal simulation a catastrophe?
[DE81-026750] N82-11588
NONLINEAR EQUATIONS
Classical field theory with Z(3) symmetry
[DE81-027089] N82-11969
NONLINEAR OPTICS
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967
NONLINEAR SYSTEMS
Theory of stochastic optimal control some basic notions N82-11075
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083
Nonparametric identification of a class of nonlinear close-coupled dynamic systems
[NASA-CR-164948] N82-11098
Sensitivity theory for nonlinear systems. 2: Extensions to additional classes of responses
[DE81-030258] N82-11845
Physics in few dimensions --- condensed matter physics
[DE81-026054] N82-11853
Nonlinear waves on charged particle beams N82-11865
Symmetries of the nonlinear conductivity for a relativistic turbulent plasma
[AD-A104544] N82-11931
Linear and nonlinear theory study of Alpha Virginis
[DE81-025335] N82-12006
NONLINEARITY
Some problems in the calculation of flows with tangential discontinuities
[RAE-LIB-TRANS-2059] N82-11389
Multilinear pseudodifferential operators and paraproducts N82-11825
NONPARAMETRIC STATISTICS
Applications of non-parametric statistics and analysis of variance on sample variances
[NASA-CR-165789] N82-11834
A note on a nonparametric maximum penalized likelihood estimator of the probability density function of a positive random variable. AMPLE with positive support
[AD-A104476] N82-11836
NONUNIFORM FLOW
A wake source model for non-symmetric flow past bluff bodies in two-dimensional flow
[C-OF-A-MEMO-8109] N82-11037
NONUNIFORM PLASMAS
Oblique propagation of electron thermal modes below the electron plasma frequency without boundary effects
[IPPJ-533] N82-11928
NORMAL DENSITY FUNCTIONS
An ultrasonic transducer with Gaussian radial velocity distribution N82-11130
NORTH DAKOTA
Great Plains gasification project, Mercer County, North Dakota; water assessment report section 13(c)
[PB81-216111] N82-11524
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525
NORWAY
Plan for technological research and development related to the petroleum activities on the Norwegian Continental Shelf. 1981-1985: Appendixes: 1. Technical challenges. 2. Research requirements. 3. High priority programs
[DE81-904014] N82-11520
NOSE CONES
Electromagnetic field mapping of cylinder and missile nosecone
[AD-A104312] N82-11104
NOVA LASER SYSTEM
Nova pulse power system description and status
[DE81-025600] N82-11898
NOZZLE DESIGN
Acta Mechanica Sinica (selected articles)
[AD-A105636] N82-11019
NOZZLE FLOW
Acta Mechanica Sinica (selected articles)
[AD-A105636] N82-11019
On transonic flow in hyperbolic Laval nozzles --- the conformal curvilinear coordinate method N82-11020
Compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel N82-11021
Prediction of turbulent boundary layer separation N82-11022
NOZZLE INSERTS
Wind tunnel supplementary Mach number minimum section insert
[NASA-CASE-LAR-12532-1] N82-11088
NUCLEAR AUXILIARY POWER UNITS
Space nuclear safety and fuels program
[DE81-030501] N82-11891
NUCLEAR CAPTURE
Statistical versus valence neutron neutron capture in Mo-98
[DE81-023943] N82-11880
NUCLEAR FUELS
Space nuclear safety and fuels program
[DE81-030501] N82-11891
Production and characterization of pure cryogenic inertial fusion targets
[DE81-025920] N82-11937
Shock effects in particle-beam fusion targets
[DE81-027806] N82-11952
NUCLEAR FUSION
Fusion as a source of synthetic fuels
[BNL-29281] N82-11257
Theory of electron cyclotron heating in the Constance 2 experiment
[DE81-028269] N82-11906
Plasma assessments for the Fusion Engineering Device (FED)
[DE81-024254] N82-11948
Magnets for the Tandem Mirror Fusion Power Reactor WITAMIR-I
[DE81-025568] N82-11954
NUCLEAR REACTORS
Trap activation model for hydrogen retention and isotope exchange in some refractory materials
[DE81-025995] N82-11221
Magnets for the Tandem Mirror Fusion Power Reactor WITAMIR-I
[DE81-025568] N82-11954

NUCLEAR SCATTERING
Use of nuclear resonant scattering of Gamma rays for in vivo measurement of iron
[DE81-026051] N82-11775
NUCLEATION
Epitaxial morphologies and deposition energetics of polyoxymethylene N82-11204
NUCLEOTIDES
Cyclic nucleotides in tissues during long-term hypokinesia
[NASA-TM-76726] N82-11757
NUMERICAL ANALYSIS
A three-dimensional simulation of transition and early turbulence in a time-developing mixing layer
[NASA-CR-164942] N82-11393
Difference method in fluid dynamics. 1. Numerical solution of two dimensional vorticity equation N82-12022
Numerical computation and analysis of the flow field in a large shock tube with a variable cross-sectional area N82-12026
NUMERICAL CONTROL
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438
Software design of a general purpose data acquisition and control executive --- plasma diagnostics
[DE81-026573] N82-11810
NUMERICAL FLOW VISUALIZATION
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036
A wake source model for non-symmetric flow past bluff bodies in two-dimensional flow
[C-OF-A-MEMO-8109] N82-11037
Generation of axi-symmetric body shapes in subsonic flow by means of polynomial distributions of sources and doublets along the axis of symmetry
[C-OF-A-MEMO-8110] N82-11038
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
Higher-level simulations of turbulent flows
[NASA-CR-164936] N82-11395
NUTS (FRUITS)
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663

O

OCEAN BOTTOM
Studies of continental and oceanic crust from seismic, geodetic and magnetic observations N82-11685
Wave propagation over rectangular trench
[PB81-220782] N82-11752
An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857
OCEAN CURRENTS
Critical wave conditions for sand motion initiation
[AD-A104376] N82-11400
Ocean energy-waves, currents, and tides
[DE81-025708] N82-11611
Oceans and ocean currents: Their influence on climate
[DE81-027263] N82-11731
An inverse technique for determination of mean ocean circulation N82-11756
OCEAN DATA ACQUISITIONS SYSTEMS
Technology transfer of NASA microwave remote sensing system
[NASA-CR-165791] N82-11515
OCEAN SURFACE
Relationships between synoptic storm activity and sea surface temperature anomalies over the North Pacific Ocean
[AD-A104590] N82-11727
An open-ocean marine fog development and forecast model for Ocean Weather Station Papa
[AD-A104595] N82-11729
Climate Diagnostics Workshop (5th) annual proceedings
[PB81-222200] N82-11735
Numerical studies of hurricane-ocean interactions
[PB81-225575] N82-11741
OCEAN THERMAL ENERGY CONVERSION
Ocean thermal energy conversion gas-desorption studies. Volume 2: Deaeration in a packed column and a barometric intake system
[DE81-030469] N82-11619
OTEC environmental biological oceanographic program
[DE81-027402] N82-11645
OCEANOGRAPHIC PARAMETERS
Technology transfer of NASA microwave remote sensing system
[NASA-CR-165791] N82-11515
Oceans and ocean currents: Their influence on climate
[DE81-027263] N82-11731
Conditional sampling of oceanic temperature and pressure
[AD-A104539] N82-11751
OFFSHORE ENERGY SOURCES
Petroleum geology and resource assessment of the middle Caspian Basin, USSR, with special emphasis on the Uzen field
[DE81-029951] N82-11518
Plan for technological research and development related to the petroleum activities on the Norwegian Continental Shelf. 1981-1985: Appendixes: 1. Technical challenges. 2. Research requirements. 3. High priority programs
[DE81-904014] N82-11520
Oceans and ocean currents: Their influence on climate
[DE81-027263] N82-11731
OHIO
Water resources data for Ohio, water year 1980. Volume 2: St. Lawrence River basin
[PB81-217077] N82-11528
OHMIC DISSIPATION
Energy losses in conductors carrying very high currents
[DE81-025367] N82-11373
OIL EXPLORATION
Plan for technological research and development related to the petroleum activities on the Norwegian Continental Shelf. 1981-1985: Appendixes: 1. Technical challenges. 2. Research requirements. 3. High priority programs
[DE81-904014] N82-11520
OIL FIELDS
Petroleum geology and resource assessment of the middle Caspian Basin, USSR, with special emphasis on the Uzen field
[DE81-029951] N82-11518
OIL POLLUTION
Detection of oil in water by a flame emission technique
[PB81-226185] N82-11178
OIL RECOVERY
Algorithm for computing in-situ combustion oil recovery performance
[DE81-030340] N82-11153
OKLAHOMA
COCORP traverses in Wyoming and Oklahoma N82-11684
ON-LINE SYSTEMS
On-line failure detection of vibrating structures
[UCRL-86099] N82-11505
Engineering Analysis System (EASY)
[DE81-027508] N82-11846
Automated water monitor system field demonstration test report. Volume 1: Executive summary
[NASA-CR-166228] N82-11991
Automated water monitor system field demonstration test report. Volume 2: Technical summary
[NASA-CR-166229] N82-11992
OPERATING COSTS
Networks consolidation program: Maintenance and Operations (M&O) staffing estimates N82-11303
OPERATING SYSTEMS (COMPUTERS)
Some notes on operating-system principles
[DE81-030675] N82-11818
OPERATIONAL AMPLIFIERS
Low noise tuned amplifier
[NASA-CASE-GSC-12567-1] N82-11359
OPERATIONAL HAZARDS
Investigation of Lithium Sulfur Dioxide (Li/SO2) battery safety hazard
[AD-A104326] N82-11552
OPERATIONAL PROBLEMS
Photovoltaic operations manual radio station WBNO
[DE81-027439] N82-11603
OPERATORS (MATHEMATICS)
Multilinear pseudodifferential operators and paraproducts N82-11825
OPTICAL COMMUNICATION
The deep space optical channel. 2: Wave propagation effects N82-11288
InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452
Local distribution fiber optic cable communication system
[AD-A104491] N82-11911
OPTICAL EQUIPMENT
Determination of pulsed CO2 laser damage thresholds of optical surfaces
[AD-A104424] N82-11456
OPTICAL FILTERS
Binary/analog CCD correlator development
[AD-A104438] N82-11363
OPTICAL MEASURING INSTRUMENTS
Soot formation in synfuels
[DE81-030273] N82-11164
Reflection/transmission phase shift interferometer and viewing optics
[DE81-027658] N82-11916
OPTICAL PROPERTIES
Polishing-to-figuring transition in turned optics
[DE81-028691] N82-11917
High-pressure optical studies
[DE81-025577] N82-11918
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967
OPTICAL PUMPING
Investigation of direct solar-to-microwave energy conversion techniques
[NASA-CR-161883] N82-11544
OPTICAL RESONANCE
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967
OPTICAL SCANNERS
Reliability and maintainability assessment report for laser scanner image generation system, revision A
[AD-A104239] N82-11455
OPTICAL WAVEGUIDES
Single mode optical waveguide design investigation
[AD-A104584] N82-11913
Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers
[PB81-224610] N82-11920
OPTIMAL CONTROL
Flight trajectory control investigation
[AD-A104542] N82-11048
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
An overview of optimal control in aerospace systems N82-11074
Theory of stochastic optimal control some basic notions N82-11075
An introduction to stochasic optimal control theory N82-11076
Design considerations for optimal flight control systems N82-11077
Design techniques for mutlivariable flight control systems N82-11078
Control law design for transport aircraft flight tasks N82-11080
Control design of flexible spacecraft N82-11081
Optimum climb and descent trajectories for airline missions N82-11082
Management of redundancy in flight control systems using optimal decision theory N82-11084
Optimal control in the lunar module digital autopilot N82-11085
Application of optimal control techniques to tactical missile guidance N82-11086
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
Partial differential equations from dynamic programming equations N82-11822

OPTIMIZATION
Algorithm for fuel conservative horizontal capture trajectories
[NASA-TM-81334] N82-11018
An optimization model for energy generation and distribution in a dynamic facility N82-11310
Computer-aided heat-pump design and optimization
[DE81-024965] N82-11415
Modeling energy-conservation potentials of community energy-system technologies
[DE81-026059] N82-11589
Fidelity optimization of microprocessor system simulations
[AD-A104679] N82-11786
Projected Newton methods and optimization of multicommodity flows
[AD-A104419] N82-11844
ORBIT TRANSFER VEHICLES
Analysis of space systems study for the space disposal of nuclear waste study report. Volume 2: Technical report
[NASA-CR-161888] N82-11889
ORBITAL LAUNCHING
Mission operation report: RCA-D/Delta launch
[NASA-TM-84063] N82-11102
ORBITAL SPACE STATIONS
Technology for large space systems: A special bibliography
[NASA-SP-7046(05)] N82-11093
ORDER-DISORDER TRANSFORMATIONS
Contribution to the characterization of the anelastic properties of multi-phase systems
[DE81-025581] N82-11198
OREGON
Water resources data for Oregon, water year 1979
[PB81-226771] N82-11542
ORGANIC CHEMISTRY
Shock-induced organic chemistry
[DE81-024442] N82-11115
ORGANIC COMPOUNDS
Response of portable VOC analyzers to chemical mixtures
[PB81-234262] N82-11176
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 1, phase 2
[AD-A104552] N82-11484
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 2, phase 2
[AD-A104553] N82-11485
Nitrogen dynamics in a lagoon development and an adjacent salt marsh N82-11632
Liquid-liquid chromatography fractionation of organic compounds in complex mixtures: Application to automobile exhaust
[DE81-030743] N82-11650
ORGANIC SILICON COMPOUNDS
Thermal control coatings based on trialkoxysilane hydrolysate binders --- tolerance to ultraviolet radiation in vacuum
[NASA-CASE-MFS-25620-1] N82-11118
ORGANOMETALLIC COMPOUNDS
Antireflecting film development --- for resisting damage from laser pulses
[DE81-030010] N82-11915
ORION CONSTELLATION
Nonradial pulsations of upsilon Orionis and supergiants
[DE81-025338] N82-12005
ORTHOGONAL FUNCTIONS
Tropical storm movement based on synoptic map typing using empirical orthogonal functions
[AD-A104591] N82-11728
Nonclassical orthogonal polynomials and differential equations N82-11823
ORTHOGONALITY
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted N82-11015
OTOLITH ORGANS
USSR report. Life sciences biomedical and behavioral sciences, no. 12
[JPRS-79338] N82-11762
Otolithic reflex and space perception function of cosmonauts N82-11764
OUTER SPACE TREATY
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989
OUTGASSING
Outgassing of two synthetic fuels
[AD-A104580] N82-11231
OXIDATION
Peat biogasification development program
[DE81-028299] N82-11243
Vapor-phase cracking and wet oxidation as potential pollutant control techniques for coal gasification
[PB81-219594] N82-11661
OXIDATION RESISTANCE
Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76608] N82-11120
OXIDES
Innovative technology for fabrication of ceramics: EDS rapid solidification process application to specialized materials
[PB81-214868] N82-11222
OXYGEN ATOMS
Reaction of oxygen atoms with ethylene and vinylbromide
[DE81-025206] N82-11879
OXYGEN METABOLISM
Ozone exposure and pulmonary metabolic effects of mediators and hormones
[PB81-222408] N82-11779
OXYGEN PRODUCTION
Direct observation of excited oxygen atom production and deactivation N82-11868
OXYGEN SUPPLY EQUIPMENT
Recommended guidelines for oxygen self-rescuers. Volume 1: Underground coal mining
[PB81-225872] N82-11782
Recommended guidelines for oxygen self-rescuers. Volume 2: Appendices
[PB81-225880] N82-11783
OZONE
Report of Lawrence Livermore National Laboratory to the Federal Aviation Agency on the high-altitude pollution program, 1980
[DE81-028264] N82-11647
OZONOMETRY
Ozone exposure and pulmonary metabolic effects of mediators and hormones
[PB81-222408] N82-11779

P

P-N JUNCTIONS
Analysis of indium-phosphide/indium tin oxide solar cells
[DE81-025907] N82-11610
P-TYPE SEMICONDUCTORS
Growth of silicon sheets from metallurgical-grade silicon
[DE81-025703] N82-11605
A study of metal-semiconductor contacts on indium phosphide
[AD-A104439] N82-11965
PACIFIC NORTHWEST (US)
Raft River geothermal project groundwater monitoring program
[DE81-030202] N82-11521
PACIFIC OCEAN
Relationships between synoptic storm activity and sea surface temperature anomalies over the North Pacific Ocean
[AD-A104590] N82-11727
Tropical storm movement based on synoptic map typing using empirical orthogonal functions
[AD-A104591] N82-11728
An open-ocean marine fog development and forecast model for Ocean Weather Station Papa
[AD-A104595] N82-11729
Comparison of ocean and island rainfall in the tropical South Pacific, Atlantic, and Indian Oceans
[PB81-225401] N82-11745
PACKET TRANSMISSION
Packet Speech Systems Technology
[AD-A104373] N82-11348
PACKETS (COMMUNICATION)
Packet Speech Systems Technology
[AD-A104373] N82-11348
PAINTS
Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics
[DE81-030423] N82-11218
PAIR PRODUCTION
Detection and study of new heavy particles through jet identification
[DE81-025151] N82-11882
The Bogoliubov transformation and its application to cosmological particle production N82-12009
A model of the normal and null states of pulsars
[PB81-215907] N82-12011
PALLADIUM
Electronic structure and many-body effects in Pd
[DE81-023110] N82-11970
PARABOLIC DIFFERENTIAL EQUATIONS
Boundary observability and controllability for diffusion equations
[AD-A104293] N82-11829
PARABOLIC REFLECTORS
Design, cost and performance comparisons of several solar thermal systems for process heat. Volume 1: Executive summary
[DE81-029881] N82-11576
PARACHUTES
Use of a hybrid computer for the flight simulation of a bomb/parachute system
[DE81-025141] N82-11797
PARALLEL PROCESSING (COMPUTERS)
Multiple-instruction, multiple-data path computers: Parallel processing impact on flight simulation software
[AD-A104506] N82-11789
Philosophy of supercomputing
[DE81-028586] N82-11796
SAR processing on the MPP
[NASA-CR-166726] N82-11801
PARAMETER IDENTIFICATION
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
Nonparametric identification of a class of nonlinear close-coupled dynamic systems
[NASA-CR-164948] N82-11098
Parameter estimation of large flexible aerospace structures with application to the control of the Maypole Deployable Reflector
[NASA-CR-164971] N82-11099
Modulation/demodulation techniques for satellite communications. Part 4: Appendices
[NASA-CR-164954] N82-11341
PARAMETERIZATION
Parametric sensitivity study for solar-assisted heat-pump systems
[DE81-030309] N82-11407
Storage ring injection
[DE81-023846] N82-11901
Linear and nonlinear theory study of Alpha Virginis
[DE81-025335] N82-12006
PARTIAL DIFFERENTIAL EQUATIONS
Partial differential equations from dynamic programming equations N82-11822
PARTICLE ACCELERATION
A model of the normal and null states of pulsars
[PB81-215907] N82-12011
PARTICLE ACCELERATOR TARGETS
Use of molecular beams to support microspheres during plasma coating
[DE81-025601] N82-11873
Production and characterization of pure cryogenic inertial fusion targets
[DE81-025920] N82-11937
Shock effects in particle-beam fusion targets
[DE81-027806] N82-11952
PARTICLE ACCELERATORS
Considerations for the design, implementation, and effective operation of Sandia's super-power generators
[DE81-025404] N82-11908
PARTICLE BEAMS
Nonlinear waves on charged particle beams N82-11865
Modular accelerator interconnecting and operating systems for PBFA-1
[DE81-025397] N82-11887
Shock effects in particle-beam fusion targets
[DE81-027806] N82-11952

PARTICLE DIFFUSION
Diffusivity of particles moving rapidly through a turbulent fluid
[DE81-030414] N82-11408
PARTICLE EMISSION
Microstructures for high-energy X-ray and particle-imaging applications
[DE81-026531] N82-11899
PARTICLE FLUX DENSITY
The angular impact distribution of charged particles attracted to a charged cylindrical spacecraft
[AD-A104519] N82-11108
PARTICLE INTERACTIONS
Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903
PARTICLE SIZE DISTRIBUTION
Microstructure and properties of dual-phase steels containing fine precipitates
[DE81-029946] N82-11192
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637
Chebyshev polynomial approximation in the OPAQUE program
[AD-A104317] N82-11638
PARTICLE THEORY
Detection and study of new heavy particles through jet identification
[DE81-025151] N82-11882
PARTICLE TRAJECTORIES
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
Particle trajectories in a model electric field 1 --- neutralizing spacecraft surfaces
[AD-A104507] N82-11870
Ion-reversibility studies in amorphous solids using the two-atom scattering model
[DE81-025188] N82-11886
PARTICLES
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654
A theoretical and experimental investigation of the photometric functions of particulate surfaces
N82-12012
PARTICULATE SAMPLING
Informational report on the measurement and characterization of diesel exhaust emissions
[PB81-221251] N82-11175
Airborne radiological sampling of Mount St. Helens plumes
[PB81-213795] N82-11659
PARTITIONS (STRUCTURES)
Racking tests of non-structural building partitions (The behavior of architectural (nonstructural) building components during earthquakes)
[PB81-220790] N82-11328
PASSENGER AIRCRAFT
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068
PASSIVITY
Thin-film polycrystaline silicon solar cells: Progress and problems
[DE81-025704] N82-11608
PATENT POLICY
NASA Patent Abstracts bibliography: A continuing bibliography, section 1, abstracts. Supplement 19
[NASA-SP-7039(19)-SEC-1] N82-11981
NASA Patent Abstracts Bibliography: A continuing bibliography, section 2, indexes. Supplement 19
[NASA-SP-7039(19)-SEC-2] N82-11982
PATTERN RECOGNITION
Identification of lithologic units using multichannel imaging systems N82-11509
The quantitative recognition and evaluation of seismic quiescence: Applications to earthquake prediction and subduction zone tectonics
N82-11682
PAVEMENTS
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Probabilistic modeling of subgrade soil strengths
[AD-A104336] N82-11315
Evaluation of base courses for flexible pavements
[PB81-218372] N82-11329
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program
[AD-A104546] N82-11499
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program
[AD-A104547] N82-11500
PAYLOAD DELIVERY (STS)
Analysis of space systems study for the space disposal of nuclear waste study report. Volume 2: Technical report
[NASA-CR-161888] N82-11889
PCM TELEMETRY
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438
PDP 11 COMPUTER
Digital ultrasonics signal processing: Flaw data post processing use and description
[NASA-CR-161882] N82-11862
PEAT
Peat biogasification development program
[DE81-028299] N82-11243
PEBBLE BED REACTORS
KUGEL: A thermal, hydraulic, fuel performance and gaseous fission product release code for pebble bed reactor core analysis
[DE81-026561] N82-11904
PENNSYLVANIA
Calculations from compliance emissions of long and short term SO2 concentrations in the southwest Pennsylvania air quality control region
[PB81-226078] N82-11678
PERFORMANCE PREDICTION
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
Tennessee Valley Authority atmospheric fluidized-bed combustor simulation
[DE81-030262] N82-11151
Algorithm for computing in-situ combustion oil recovery performance
[DE81-030340] N82-11153
The effects of impurities on the performance of silicon solar cells
[NASA-CR-164945] N82-11548
Computer performance prediction of a data flow architecture
[AD-A104587] N82-11792
Jet impingement heat transfer enhancement for the GPU-3 Stirling engine
[NASA-TM-82727] N82-11993
PERFORMANCE TESTS
Test results of ac superconducting cables
[BNL-29291] N82-11371
Testing and optimizing active rotary flux compressors
[DE81-024376] N82-11378
Laboratory determination of frosting and defrosting losses for a high efficiency air-source heat pump
[DE81-023218] N82-11416
Conduct a state-of-the-art survey of existing knowledge for the design of ground-source heat pumps
[DE81-024084] N82-11420
Heat pump R and D at Oak Ridge National Laboratory
[DE81-024121] N82-11422
Performance predictions and measurements for space-power-system heat pipes
[LA-UR-81-909] N82-11426
Heat-pipe development for high-temperature recuperator application
[LA-UR-81-1414] N82-11428
Performance assessments of precipitation gages for snow measurement
[PB81-218547] N82-11443
Performance testing of the TOLTEC TI-410 concentrating solar collector
[DE81-029994] N82-11617
COBOL Compiler: Mohawk data sciences MDS COBOL release 12 ANSI 74, series 21-models 40, 50, series 21 operating system 2
[PB81-226425] N82-11798
Perkin-Elmer COBOL R06 Perkin-Elmer model 3240 OS/32 REV 05.02
[PB81-223885] N82-11799
Evaluation of the micro-carburetor
[NASA-CR-164958] N82-11994
Lithium/iron sulfide cell development for electric-vehicle propulsion
[DE81-023570] N82-11996
PERSONNEL MANAGEMENT
Networks consolidation program: Maintenance and Operations (M&O) staffing estimates N82-11303
Applying science and technology to improve local government productivity
[PB81-217986] N82-11978
PESTICIDES
Manual of analytical quality control for pesticides and related compounds in human and environmental samples
[PB81-222721] N82-11171
PETN
Numerical model study of burning and detonation in small PETN-loaded assemblies
[DE81-028594] N82-11162
PHASE CONTROL
System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861
PHASE SHIFT
Electronic structure and many-body effects in Pd
[DE81-023110] N82-11970
PHASE TRANSFORMATIONS
Contribution to the characterization of the anelastic properties of multi-phase systems
[DE81-025581] N82-11198
PHOSPHATES
Evaluation of alpha aluminum phosphate for advanced acoustic wave devices
[AD-A104685] N82-11962
PHOSPHINES
Impurity effects in a-Si:H solar cells
[DE81-025069] N82-11575
PHOSPHORIC ACID FUEL CELLS
Survey on aging on electrodes and electrocatalysts in phosphoric acid fuel cells
[NASA-CR-165505] N82-11545
Oxygen reduction on carbon-supported platinum fuel-cell electrodes in H sub 3 Po sub 4
[DE81-027303] N82-11582
PHOSPHORUS COMPOUNDS
Interface reactions in Mg/Zn3P2 solar cells
[DE81-025773] N82-11597
PHOTOCATHODES
Oxide effects on photoemission from high current GaAs photocathodes
[DE81-025129] N82-11972
PHOTOCHEMICAL REACTIONS
Lasers in materials processing
[DE81-027657] N82-11460
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607
Mathematical modeling of photochemical air pollution N82-11629
PHOTODISSOCIATION
Direct observation of excited oxygen atom production and deactivation N82-11868
PHOTOELASTICITY
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
PHOTOELECTRIC CELLS
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027254] N82-11558
PHOTOELECTRIC EMISSION
Oxide effects on photoemission from high current GaAs photocathodes
[DE81-025129] N82-11972
Photoelectric surface brightness observations and the geometry of reflection nebulae N82-12002
PHOTOELECTROCHEMICAL DEVICES
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607
PHOTOELECTROCHEMISTRY
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607

PHOTOELECTRON SPECTROSCOPY
Workshop on Atomic Physics at the National Synchrotron Light Source
[DE81-023507] N82-11874
PHOTOELECTRONS
Rocket data of solar EUV flux, thermospheric electron flux and N2 second-positive airglow emission
[AD-A104384] N82-11703
PHOTOGRAPHIC EMULSIONS
Method for retarding dye fading during archival storage of developed color photographic film --- inert atmosphere
[NASA-CASE-MFS-23250-1] N82-11432
PHOTOGRAPHIC FILM
Method for retarding dye fading during archival storage of developed color photographic film --- inert atmosphere
[NASA-CASE-MFS-23250-1] N82-11432
PHOTOIONIZATION
Electron attachment as a probe of photoionization processes in liquid media --- pyrene
[DE81-026352] N82-11163
Workshop on Atomic Physics at the National Synchrotron Light Source
[DE81-023507] N82-11874
PHOTOMETRY
A theoretical and experimental investigation of the photometric functions of particulate surfaces N82-12012
PHOTOMICROGRAPHY
Computer processing of periodic electron micrographs N82-11815
PHOTONS
Microstructures for high-energy X-ray and particle-imaging applications
[DE81-026531] N82-11899
PHOTOOXIDATION
Oxide effects on photoemission from high current GaAs photocathodes
[DE81-025129] N82-11972
PHOTOSYNTHESIS
Hydrogen production from the photosynthetic bacterium Rhodopseudomonas sphaeroides
[DE81-025831] N82-11256
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607
PHOTOVOLTAIC CELLS
Mississippi County Community College solar photovoltaic project
[DE81-030669] N82-11554
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE81-025587] N82-11577
Photovoltaic operations manual radio station WBNO
[DE81-027439] N82-11603
Carlisle house: An all-solar electric residence
[DOE/ET-20279/133] N82-11622
PHOTOVOLTAIC CONVERSION
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566
Study of photovoltaic cost elements. Volume 3: Sandia National Laboratories photovoltaic systems design catalog
[DE81-030986] N82-11567
Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568
Study of photovoltaic cost elements. Volume 5: Installation cost model for intermediate PV systems: Users manual
[DE81-030981] N82-11569
PHOTOVOLTAIC EFFECT
National photovoltaic program in amorphous materials
[DE81-025906] N82-11609
PHYSICAL CHEMISTRY
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 1, phase 2
[AD-A104552] N82-11484
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 2, phase 2
[AD-A104553] N82-11485
PHYSICAL EXERCISE
Airway gas mixing during rest and bicycle exercise N82-11768
Effects of curative treatment emphasizing endurance training on the performance and blood pressure of hypertensive and normotensives
[NASA-TM-76520] N82-11771
PHYSIOLOGICAL EFFECTS
Participation of the hypophyseal-adrenal cortex system in thrombin clearance during immobilization stress
[NASA-TM-76729] N82-11760
Ozone exposure and pulmonary metabolic effects of mediators and hormones
[PB81-222408] N82-11779
PIEZOELECTRIC CRYSTALS
Evaluation of alpha aluminum phosphate for advanced acoustic wave devices
[AD-A104685] N82-11962
PIEZOELECTRICITY
The piezomagnetic effect: Limits on detectability using a combined vector and scalar magnetometer array N82-11430
PILOT PLANTS
Advanced system experimental facility: Solid waste to methane gas. Background and process description
[DE81-030198] N82-11244
Solvent-Refined Coal-1 Demonstration Project. Final environmental impact statement, Volume 1 of 2 --- coal liquefaction plant at Newman, Kentucky
[DE81-025983] N82-11252
Surface coal gasification
[DE81-030183] N82-11253
Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269
Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270
Magma Cooling-Tower process pilot-plant demonstration
[DE81-903783] N82-11406
PILOT TRAINING
Determining the training effectiveness and cost-effectiveness of visual flight simulators for military aircraft
[AD-A104627] N82-11091
PIONEER SPACE PROBES
Pioneers 6 through 12 mission support N82-11285
PIPE FLOW
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248
Mechanistic analysis of loft pulsed neutron activation data --- pipe flow velocity
[DE81-027124] N82-11876
PIPES (TUBES)
Study of foldable elastic tubes for large space structure applications, phase 3
[NASA-CR-164929] N82-11493
PISTON ENGINES
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals
[NASA-CR-165479] N82-11466
PISTONS
Compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel N82-11021
Stirling cycle cryogenic cooler --- magnetically suspended pistons
[NASA-CASE-GSC-12697-1] N82-11312
PLAINS
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738
PLANE STRAIN
Analyses of ductile flow and fracture in two dimensions
[DE81-023651] N82-11506
PLANETARY BOUNDARY LAYER
Frontogenesis in the planetary boundary layer of an amplifying, two-dimensional baroclinic wave N82-11721
PLANETARY ENVIRONMENTS
A proposed new policy for planetary protection
[NASA-CR-164947] N82-11095
PLANETARY EVOLUTION
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691
Study of the time evolution of the lithosphere
[NASA-CR-164968] N82-11696
PLANFORMS
Effects of planform geometry on tidal flushing and mixing in Marinas
[PB81-219537] N82-11660
PLANKTON
Development of the coastal zone color scanner for NIMBUS 7. Volume 1: Mission objectives and instrument description
[NASA-CR-166720-VOL-1] N82-11511
OTEC environmental biological oceanographic program
[DE81-027402] N82-11645
PLANT DESIGN
Alternative fuel for the steel industry of Northern Indiana: A prefeasibility study of a central coal gasification project
[DE81-029314] N82-11233
Feasibility and economic study of medium-BTU coal gas blended with high-BTU by product gas as an industrial energy source at Billings, Montana
[DE81-025166] N82-11237
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8: Design approaches: UPH
[DE81-030673] N82-11620
Environmental protection as an ongoing component of large facilities engineering projects N82-11633
Development, testing, and evaluation of MHD materials and component designs. Volume 1: Executive summary
[DE81-026203] N82-11947
PLANTS (BOTANY)
Cattail rhizome-derived alcohol
[DE81-028307] N82-11234
Geothermal environmental assessment: Behavior of selected geothermal brine contaminants in plants and soils
[PB81-222333] N82-11671
PLASMA ACCELERATORS
Analytical studies of high-pressure MHD accelerators --- applications to a reentry vehicle test facility
[AD-A104686] N82-11930
PLASMA CONTROL
Theory of electron cyclotron heating in the Constance 2 experiment
[DE81-028269] N82-11906
Plasma confinement in the TMX tandem mirror
[UCRL-85883] N82-11939
PLASMA DENSITY
The effects of toroidal geometry and scattering by density fluctuations on the accessibility and energy deposition of lower hybrid waves N82-11922
PLASMA DIAGNOSTICS
Software design of a general purpose data acquisition and control executive --- plasma diagnostics
[DE81-026573] N82-11810
Improvements to a high-frequency fiber-optic system for plasma diagnostics
[DE81-028741] N82-11919
Oblique propagation of electron thermal modes below the electron plasma frequency without boundary effects
[IPPJ-533] N82-11928
PLASMA DRIFT
Theory of drift instabilities and the associated anomalous transport
[IPPJ-REV-1] N82-11924
PLASMA GENERATORS
RF-driven Tokamak reactor with sub-ignited, thermally stable operation
[DE81-029437] N82-11935
PLASMA HEATING
Boosting up of neutral beam heating power by slowly rising toroidal field --- compression
[IPPJ-534] N82-11929

Antenna-plasma coupling theory for ICRF heating of large Tokamaks
[DE81-029815] N82-11933
RF-driven Tokamak reactor with sub-ignited, thermally stable operation
[DE81-029437] N82-11935
Heating of a dense plasma with an intense relativistic electron beam: Initial observations
[DE81-025348] N82-11945
Physics considerations for the FED limiter
[DE81-027596] N82-11950

PLASMA INTERACTIONS
Ionization fluctuations in collisional ionizing shock waves --- plasma interactions N82-11864

PLASMA JETS
Temperature measurement in turbulent arcs N82-11921
Analytical studies of high-pressure MHD accelerators --- applications to a reentry vehicle test facility
[AD-A104686] N82-11930

PLASMA OSCILLATIONS
An energy integral and variational principle for plasma kinetic modes
[IPPJ-531] N82-11926

PLASMA PHYSICS
Telecommunications in cometary environments
[NASA-CR-164956] N82-11340

PLASMA POTENTIALS
Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888

PLASMA PUMPING
Physics considerations for the FED limiter
[DE81-027596] N82-11950

PLASMA RADIATION
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925

PLASMA SLABS
Physics considerations for the FED limiter
[DE81-027596] N82-11950

PLASMA SPRAYING
Use of molecular beams to support microspheres during plasma coating
[DE81-025601] N82-11873

PLASMA TURBULENCE
Temperature measurement in turbulent arcs N82-11921
Symmetries of the nonlinear conductivity for a relativistic turbulent plasma
[AD-A104544] N82-11931
Maximal entropy in fluid and plasma turbulence: A review
[DE81-025388] N82-11946

PLASMA WAVES
Non-linear evolution of an obliquely propagating Langmuir wave N82-11385
The effects of toroidal geometry and scattering by density fluctuations on the accessibility and energy deposition of lower hybrid waves N82-11922

PLASMA-ELECTROMAGNETIC INTERACTION
An energy integral and variational principle for plasma kinetic modes
[IPPJ-531] N82-11926

PLASMA-PARTICLE INTERACTIONS
Non-linear evolution of an obliquely propagating Langmuir wave N82-11385

PLASMAS (PHYSICS)
Mass spectrometry of the CO2 laser plasma
[AD-A104344] N82-11454
Stimulated Raman scattering in large plasmas
[DE81-026589] N82-11938

PLASMASPHERE
Plasmaspheric, faraday and total electron contents, 1977 and 1978
[AD-A104362] N82-11700

PLASTICS
Determination of pulsed CO2 laser damage thresholds of optical surfaces
[AD-A104424] N82-11456

PLATES (STRUCTURAL MEMBERS)
Finite element analysis of coupled magneto-mechanical problems of conducting plates
[AD-A104406] N82-11851

PLATES (TECTONICS)
A review of an attempt to create shatter cones with magnetic flyer plate technology
[NASA-CR-164614] N82-11492

PLATING
Activation of superalloys and stainless steels for chromium plating
[AD-A104313] N82-11188

PLATINUM
Studies of the kinetics and mechanism of gas-surface reactions on metal and metal oxide surfaces N82-11140

PLOTTING
Methods for presentation and display of multivariate data
[NASA-CR-165788] N82-11833

PLUMES
Airborne radiological sampling of Mount St. Helens plumes
[PB81-213795] N82-11659

PLUTONIUM OXIDES
Space nuclear safety and fuels program
[DE81-030501] N82-11891

POINT DEFECTS
Dislocation induced noises in semiconductors at low and high temperatures
[AD-A104449] N82-11960

POINT SOURCES
Selected studies of four high-temperature air-pollution sources N82-11680

POISSON RATIO
Dynamic measurement of Poisson's ratio in granular materials at 0.2 to 0.8 GPa
[DE81-027559] N82-11504

POLAR METEOROLOGY
The 4-day temperature wave in the winter polar stratosphere N82-11720

POLICIES
A proposed new policy for planetary protection
[NASA-CR-164947] N82-11095

POLLUTION CONTROL
Coal gasifier parameters influencing environmental pollutant production
[PB81-221301] N82-11273
An evaluation of three-way control single and dual bed catalysts as applied to heavy-duty gasoline engines
[PB81-224982] N82-11477
Intergrated assessment for energy-related environmental standards: A summary of issues and findings
[DE81-028552] N82-11646
Sulfur pollution control. Phase 1: The disposal program
[PB81-222612] N82-11652
Sulfur pollution control. Phase 2: The impact of stack gas cleanup on the sulfur mining industry of Texas and Louisiana
[PB81-222820] N82-11653
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2
[PB81-222267] N82-11654
Sulfur pollution control. Phase 1: The disposal program (sections 5 through 7)
[PB81-222804] N82-11655
Assessment of hazard potential from combustion of wastes in industrial boilers
[PB81-221889] N82-11656
Industrial process fugitive emissions inventory for the Region V Great Lakes shoreline
[PB81-212037] N82-11658
Vapor-phase cracking and wet oxidation as potential pollutant control techniques for coal gasification
[PB81-219594] N82-11661
Control techniques for sulfur oxide emissions from stationary sources, second edition
[PB81-220048] N82-11662
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 6: Innovation by regulation: The administration of control technology requirements under the Clean Air Act
[PB81-221616] N82-11664
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 7: Periodic review and technological escalation of performance standards: New source performance standards review process
[PB81-218117] N82-11665
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 8: Controlled trading and site-specific SIP revisions: Competing for attention in a crowded administrative route
[PB81-218273] N82-11666
Evaluation of exhaust emissions data for diesel engines used in underround mines
[PB81-225377] N82-11673
Use of a vegetative filter zone to control fine-grained sediments from surface mines
[PB81-226110] N82-11674
EPA utility FGD (Flue Gas Desulfurization) survey
[PB81-225773] N82-11679
Handbook for industrial noise control
[NASA-SP-5108] N82-11858
FGDIS primer: Major equipment/component classifications, problem/solution access codes, and definitions related to FGD systems as contained in the Flue Gas Desulfurization Information System (FGDIS)
[PB81-225948] N82-11985

POLLUTION MONITORING
Manual of analytical quality control for pesticides and related compounds in human and environmental samples
[PB81-222721] N82-11171
Detection of oil in water by a flame emission technique
[PB81-226185] N82-11178
Waste-assimilation capacity of the Arkansas River in Pueblo County, Colorado, as it relates to water-quality guidelines and stream classification
[PB81-227340] N82-11540
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637
Proof of concept study
[AD-A104338] N82-11639
Trace-element and phase relations in fly ash
[DE81-028555] N82-11643
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669
Evaluation of exhaust emissions data for diesel engines used in underround mines
[PB81-225377] N82-11673
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 1
[PB81-225286] N82-11675
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 2
[PB81-225294] N82-11676
Technical activities of the Office of Environmental Measurements - 1980
[PB81-227860] N82-11677
Laser induced fluoroescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758

POLLUTION TRANSPORT
Temperature and solute-transport simulation in streamflow using a Lagrangian reference frame
[PB81-225757] N82-11543
Mathematical modeling of photochemical air pollution N82-11629
Geochemical controls on trace metal transport in aqueous environmental systems N82-11631
Report of Lawrence Livermore National Laboratory to the Federal Aviation Agency on the high-altitude pollution program, 1980
[DE81-028264] N82-11647
Effects of acid precipitation on cation transport in New Hampshire forest soils
[DE81-027494] N82-11648
Calculations from compliance emissions of long and short term SO2 concentrations in the southwest Pennsylvania air quality control region
[PB81-226078] N82-11678
Workbook for estimating the climatology of regional continental scale atmospheric dispersion and deposition over the United States
[PB81-224172] N82-11748

POLOIDAL FLUX
Preliminary activation calculations for the poloidal divertor experiment
[DE81-026525] N82-11942

POLYCRYSTALS
Thin-film polycrystaline silicon solar cells: Progress and problems
[DE81-025704] N82-11608
POLYETHER RESINS
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212
POLYIMIDE RESINS
Novel improved PMR polyimides
[NASA-TM-82733] N82-11117
POLYIMIDES
Novel improved PMR polyimides
[NASA-TM-82733] N82-11117
Aluminum ion-containing polyimide adhesives
[NASA-CASE-LAR-12640-1] N82-11206
POLYMORPHISM
Epitaxial morphologies and deposition energetics of polyoxymethylene N82-11204
POLYNOMIALS
Nonclassical orthogonal polynomials and differential equations N82-11823
Numerical differentiation of noisy data
[AD-A104631] N82-11831
POLYTETRAFLUOROETHYLENE
Effects of ionizing radiation on the chemical structure, crystalline content and molecular weight distribution of various Teflon resins N82-11203
POLYURETHANE FOAM
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212
POLYURETHANE RESINS
Dynamic fracture in viscoelastic solids
[AD-A104687] N82-11494
POROUS MATERIALS
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
Castable high temperature fractory materials
[NASA-CASE-LEW-13080-2] N82-11210
Mean values and an inverse problem for porous media flow
[DE81-027210] N82-11411
POSITION (LOCATION)
New Hampshire and Vermont point source inventory update for NECRMP
[PB81-219339] N82-11672
POSTMISSION ANALYSIS (SPACECRAFT)
ATS-5 12 year in orbit evaluation
[NASA-CR-166728] N82-11101
POTASSIUM
Mass spectrometric studies of MHD slag thermochemistry
[PB81-221434] N82-11173
Laboratory study for removal of organic sulfur from coal
[DE81-025132] N82-11239
POTENTIAL ENERGY
Vibrational spectra and atom-atom potentials in the crystalline state. 1: A comparison of hexasulfur, octasulfur and dodecasulfur. 2: A study of solid aliene N82-11957
POTENTIAL FLOW
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036
Generation of axi-symmetric body shapes in subsonic flow by means of polynomial distributions of sources and doublets along the axis of symmetry
[C-OF-A-MEMO-8110] N82-11038
Calculations of transonic potential flow over cascades
[NASA-CR-165471] N82-11041
POTENTIAL GRADIENTS
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 2 --- potential gradients and polarization curves
[DE81-904210] N82-11383
POWDER (PARTICLES)
Innovative technology for fabrication of ceramics: EDS rapid solidification process application to specialized materials
[PB81-214868] N82-11222
Preignition volatile yield as related to coal characteristics
[DE81-027584] N82-11250
POWDER METALLURGY
Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182
POWDERED ALUMINUM
High-temperature enthalpy and X-ray powder diffraction data for aluminum sulfide (Al2S)
[PB81-226250] N82-11174
Aluminum ion-containing polyimide adhesives
[NASA-CASE-LAR-12640-1] N82-11206
POWER AMPLIFIERS
Failure mechanism study of GaAs technology
[AD-A104440] N82-11963
POWER MODULES (STS)
Concept for a power system controller for large space electrical power systems
[NASA-TP-1939] N82-11109
POWER SPECTRA
Determination of the spectra of modulated pulse trains by the spectral function method
[RAE-LIB-TRANS-2058] N82-11335
PRECIPITATION (CHEMISTRY)
Aluminum recovery from fly ash and shale-retort wastes
[DE81-027675] N82-11154
Microstructure and properties of dual-phase steels containing fine precipitates
[DE81-029946] N82-11192
PRECIPITATION (METEOROLOGY)
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-76617] N82-11725
Precipitation characteristics of summer storms at Straight Canyon barometer, Watershed, Utah
[PB81-223950] N82-11750
PREDICTION ANALYSIS TECHNIQUES
Prediction of turbulent boundary layer separation N82-11022
Development of prediction method for transonic shock induced separated flow
[AD-A104566] N82-11403
Preliminary development of a technique for estimating municipal-solid-waste generation
[DE81-024152] N82-11590
The quantitative recognition and evaluation of seismic quiescence: Applications to earthquake prediction and subduction zone tectonics N82-11682
H-O precessor computer code
[DE81-026669] N82-11814
Uncertainty analysis for geologic disposal of radioactive waste
[DE81-027206] N82-11893
Inclusion of a simple vegetation layer in terrain temperature models for thermal infrared (IR) signature prediction
[AD-A104469] N82-11910
PREPREGS
The industrial processing of unidirectional fiber prepregs
[NASA-TM-76599] N82-11119
PRESSING (FORMING)
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220
PRESSURE DISTRIBUTION
The wave diagrams for diffraction and reflection of a traveling weak shock wave from an open end of a shock tube N82-11017
The comparison between the unsteady pressure fields calculated and measured on the ZKP model
[RAE-LIB-TRANS-2061] N82-11029
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
PRESSURE EFFECTS
Monte Carlo calculations of the melting point of iron at core pressures N82-11681
High-pressure optical studies
[DE81-025577] N82-11918
PRESSURE MEASUREMENTS
Dynamic measurement of Poisson's ratio in granular materials at 0.2 to 0.8 GPa
[DE81-027559] N82-11504
PRESSURE VESSEL DESIGN
Novel design of pressure vessels and thermal shields in coal gasifiers
[DE81-025828] N82-11474
PRESSURE VESSELS
Novel design of pressure vessels and thermal shields in coal gasifiers
[DE81-025828] N82-11474
PRESSURIZING
Relaxation of geothermal-reservoir stresses induced by heat production
[DE81-032024] N82-11715
PROBABILITY DENSITY FUNCTIONS
A note on a nonparametric maximum penalized likelihood estimator of the probability density function of a positive random variable. AMPLE with positive support
[AD-A104476] N82-11836
An upper bound on the probability density function in terms of Fisher information. A bound to the density function
[AD-A104474] N82-11837
PROBLEM SOLVING
Mechanical transformation of task heuristics into operational procedures
[AD-A104674] N82-11802
A second-order accurate procedure for solving the boundary layer equations based on the predictor-corrector form of the Crank-Nicolson Scheme
[NAL-TR-655] N82-11826
PROCEDURES
Proposed standard requirements and procedures for icing clearance N82-11061
Manual of analytical quality control for pesticides and related compounds in human and environmental samples
[PB81-222721] N82-11171
PROCESS HEAT
Design, cost and performance comparisons of several solar thermal systems for process heat. Volume 1: Executive summary
[DE81-029881] N82-11576
Residual-energy-applications program: EAST-facility requirements document
[DE81-027489] N82-11616
PRODUCT DEVELOPMENT
Study and development of an integrated head-up display
[AD-A104337] N82-11062
DOE solar-assisted heat-pump program: Its evolution and its potential
[DE81-026055] N82-11413
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Solar cell development for the power extension package
[NASA-TM-82685] N82-11551
Second generation heliostat program, September 1979-March 1981
[DE81-029752] N82-11570
PRODUCTION ENGINEERING
Manufacturing methods and technology engineering for tape chip carrier
[AD-A104393] N82-11365
PRODUCTIVITY
Applying science and technology to improve local government productivity
[PB81-217986] N82-11978
PROGRAM VERIFICATION (COMPUTERS)
COBOL Compiler: Mohawk data sciences MDS COBOL release 12 ANSI 74, series 21-models 40, 50, series 21 operating system 2
[PB81-226425] N82-11798
Perkin-Elmer COBOL R06 Perkin-Elmer model 3240 OS/32 REV 05.02
[PB81-223885] N82-11799
Analysis of 4&5 data --- program evaluation
[AD-A104249] N82-11804
The effects of the symbology and spatial arrangement of software specifications in a debugging task
[AD-A104541] N82-11806
PROGRAMMING LANGUAGES
Philosophy of supercomputing
[DE81-028586] N82-11796
OBJ-1: A study in executable algebraic formal specification
[AD-A104468] N82-11803
GRAMPS: A graphics language interpreter for real time, interactive, three dimensional picture editing and animation
[DE81-027398] N82-11811

PROJECT PLANNING
Project demonstration of wind-turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE81-030950] N82-11380
DOE solar-assisted heat-pump program: Its evolution and its potential
[DE81-026055] N82-11413
Planning a comprehensive program for exploration of the anthracite deposits of the Narragansett Basin of Massachusetts and Rhode Island, phase 1 and 2
[DE81-028490] N82-11519
Great Plains gasification project, Mercer County, North Dakota; water assessment report section 13(c)
[PB81-216111] N82-11524
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525
Military space doctrine: The great frontier
[AD-A104574] N82-11990

PROJECT SETI
The Telecommunications and Data Acquisition report
[NASA-CR-164939] N82-11279
A dedicated 26-m SETI sky survey instrument facility: A feasibility study N82-11281

PROJECTIVE GEOMETRY
Projection pursuit methods for data analysis
[DE81-027493] N82-11842

PROPELLANT GRAINS
Acta Mechania Sinica
[AD-A105635] N82-12021
Analytical design for internal burning star grains of solid rockets N82-12025

PROPELLANTS
Development of inverse Raman spectroscopy for probing rapidly decomposing explosives and propellants
[AD-A104382] N82-11226
Correlation of shock-initiation tests for explosives and propellants
[DE81-026533] N82-11264

PROPULSION SYSTEM PERFORMANCE
JT8D high pressure compressor performance improvement
[NASA-CR-165531] N82-11467
Assessment of flywheel system benefits in selected vehicle applications
[DE81-025976] N82-11997

PROPULSIVE EFFICIENCY
Assessment of I.C. engines as drivers for heat actuated heat pumps
[DE81-024086] N82-11421

PROSTHETIC DEVICES
Fabrication and wear test of a continuous fiber/particulate composite total surface hip replacement
[NASA-TM-81746] N82-11211

PROTACTINIUM COMPOUNDS
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170

PROTECTION
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 1 --- underground transmission lines
[DE81-904195] N82-11382
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 2 --- potential gradients and polarization curves
[DE81-904210] N82-11383

PROTECTIVE COATINGS
Thermal control coatings based on trialkoxysilane hydrolysate binders --- tolerance to ultraviolet radiation in vacuum
[NASA-CASE-MFS-25620-1] N82-11118
Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76608] N82-11120
Fabrication and wear test of a continuous fiber/particulate composite total surface hip replacement
[NASA-TM-81746] N82-11211

PROTEIN SYNTHESIS
Cyclic nucleotides in tissues during long-term hypokinesia
[NASA-TM-76726] N82-11757
Molecular events basic to cellular radiation response
[DE81-027898] N82-11776

PROTON BEAMS
Proton induction linacs as high-intensity neutron sources
[DE81 '25825] N82-11878

PROTON IRRADIATION
Effect of energetic particle events on VLF/LF propagation parameters, 1974 - 1977
[AD-A104508] N82-11344

PROTON PRECESSION
H-O precessor computer code
[DE81-026669] N82-11814

PROTOTYPES
Development and demonstration of an ammonia-water absorption heat pump
[DE81-024126] N82-11424

PROVING
COBOL Compiler: Mohawk data sciences MDS COBOL release 12 ANSI 74, series 21-models 40, 50, series 21 operating system 2
[PB81-226425] N82-11798
Perkin-Elmer COBOL R06 Perkin-Elmer model 3240 OS/32 REV 05.02
[PB81-223885] N82-11799

PROXIMITY EFFECT (ELECTRICITY)
Superconducting proximity effect for in situ and model layered systems
[DE81-025530] N82-11372

PSEUDOMONAS
Hydrogen production from the photosynthetic bacterium Rhodopseudomonas sphaeroides
[DE81-025831] N82-11256

PSYCHOLOGICAL FACTORS
The individual versus the computer: An examination of attitude problems and their impact on system development
[AD-A104636] N82-11977

PUBLIC HEALTH
Carbon/graphite fibers: Environmental exposures and potential health implications
[PB81-229692] N82-11780

PULMONARY CIRCULATION
New approaches to quantitating the pulmonary effects on inhaled pollutants
[PB81-222382] N82-11778

PULMONARY FUNCTIONS
Ozone exposure and pulmonary metabolic effects of mediators and hormones
[PB81-222408] N82-11779

PULSARS
X-ray and gamma-ray observations of pulsed emission from radio pulsars N82-12000
A model of the normal and null states of pulsars
[PB81-215907] N82-12011

PULSE AMPLITUDE
Linear and nonlinear theory study of Alpha Virginis
[DE81-025335] N82-12006

PULSE DURATION
China report: Science and technology, no. 125
[JPRS-78932] N82-11446
Analytical description of time characteristics of high power laser pulses N82-11448
Laser triggered spark gaps under experimental study N82-11451

PULSE GENERATORS
High-voltage air-core pulse transformers
[DE81-030999] N82-11370
Modular accelerator interconnecting and operating systems for PBFA-1
[DE81-025397] N82-11887

PULSE MODULATION
Determination of the spectra of modulated pulse trains by the spectral function method
[RAE-LIB-TRANS-2058] N82-11335

PULSED LASERS
Analytical description of time characteristics high power laser pulses N82-11449
Characteristics of pulse gold vapor lasor outlined N82-11450
Development of MBE grown Pb-salt semiconductor lasers for the 8.0 to 15.0 micrometer spectral region
[NASA-CR-165683] N82-11453
Pulsed DF laser effects study
[AD-A104575] N82-11457
Nova pulse power system description and status
[DE81-025600] N82-11898

PULSED RADIATION
DC calibration of the strain sensitivity of a single mode optical fiber interferometer N82-11124
Mechanistic analysis of loft pulsed neutron activation data --- pipe flow velocity
[DE81-027124] N82-11876
Linear and nonlinear theory study of Alpha Virginis
[DE81-025335] N82-12006

PULSES
Pulsed-echo interface wave characterization of bolted plates N82-11126

PYRENES
Electron attachment as a probe of photoionization processes in liquid media --- pyrene
[DE81-026352] N82-11163

PYROHELIOMETERS
Low-cost solar array project: Four absolute cavity radiometer (pyrheliometer) intercomparisons at New River, Arizona: Radiometer standards
[NASA-CR-164950] N82-11435

PYROLYSIS
Surface coal gasification
[DE81-030183] N82-11253

PYROTECHNICS
The effects of gaseous atmospheres on the performance characteristics of aluminum-sodium nitrate flares
[AD-A104383] N82-11227

Q

QUALITY CONTROL
Manual of analytical quality control for pesticides and related compounds in human and environmental samples
[PB81-222721] N82-11171
Chemorheology and quality control for an adhesive
[AD-A104556] N82-11215
The quality assurance role in the Deep Space Network N82-11302
Analysis of 4&5 data --- program evaluation
[AD-A104249] N82-11804

QUANTITATIVE ANALYSIS
Intercomparison of techniques for the non-invasive measurement of bone mass
[DE81-029921] N82-11773

QUANTUM CHROMODYNAMICS
Elastic and inelastic psi production by muons
[DE81-025326] N82-11877
Detection and study of new heavy particles through jet identification
[DE81-025151] N82-11882

QUANTUM MECHANICS
Physics in few dimensions --- condensed matter physics
[DE81-026054] N82-11853

R

RADAR ASTRONOMY
Planetary radar N82-11309

RADAR CROSS SECTIONS
Electromagnetic scattering by targets over a real Earth
[AD-A104492] N82-11347

RADAR DATA
SAR processing on the MPP
[NASA-CR-166726] N82-11801

RADAR ECHOES
Numerical simulation of the dynamics, cloud microphysics and radar echo structures of tropical and mid-latitude convection N82-11722

RADAR IMAGERY
Digital SAR processing using a fast polynomial transform N82-11295

RADAR MAPS
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

RADAR TARGETS
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 1: Investigation of resonance extraction procedures --- for target recognition
[AD-A104530] N82-11350

Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 2: Appendices --- for target recognition
[AD-A104531] N82-11351

Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 3: Translation of Prony's method --- for target recognition
[AD-A104532] N82-11352

RADAR TRACKING

Estimation of radar range biases at multiple sites
[AD-A104306] N82-11346

RADAR TRANSMISSION

Goldstone high power radiation control
N82-11308

RADIAL DISTRIBUTION

An ultrasonic transducer with Gaussian radial velocity distribution N82-11130

RADIAL VELOCITY

An ultrasonic transducer with Gaussian radial velocity distribution N82-11130

RADIANT HEATING

High thermal power density heat transfer --- thermionic converters
[NASA-CASE-LEW-12950-1] N82-11399

Magnetohydrodynamic research program of the MHD Energy center at Mississippi State University and structural features of MHD radiant boilers
[DE81-029901] N82-11934

RADIATION COUNTERS

Use of microprocessors in a neutrino experiment
[DE81-026057] N82-11875

RADIATION DAMAGE

Evaluation of the effects of solar radiation on glasses
[NASA-CR-161907] N82-11207

Experiments in high voltage electron microscopy --- radiation damage in ceramics and alloys
[DE81-025574] N82-11375

Solar cell development for the power extension package
[NASA-TM-82685] N82-11551

Evaluation and review of alternative waste forms for immobilization of high-level radioactive wastes
[DE81-026323] N82-11909

RADIATION DETECTORS

Scientific innovation and resonance ionization spectroscopy
[DE81-023193] N82-11157

Acoustic waveguide technique for sensing incipient faults in underground power-transmission cables: Including acousto-optic techniques
[DE81-029626] N82-11381

RADIATION DISTRIBUTION

Radiation balances and the solar constant
[NASA-TM-76612] N82-12016

RADIATION DOSAGE

DARTAB: A program to combine airborne radionuclide environmental exposure data with dosimetric and health effects data to generate tabulations of predicted health impacts
[DE81-030434] N82-11774

Improved calculations of energy deposition from fast neutrons
[DE81-025385] N82-11885

Preliminary activation calculations for the poloidal divertor experiment
[DE81-026525] N82-11942

RADIATION EFFECTS

Radiation testing of composite materials, in situ versus ex situ effects
[NASA-CR-3475] N82-11116

Irradiation-induced swelling in commercial alloys
[DE81-029755] N82-11191

Molecular events basic to cellular radiation response
[DE81-027898] N82-11776

Stability of permanent-magnet parameters
[DE81-027013] N82-11852

RADIATION HARDENING

R&D services to develop an improved isolation technology radiation hardened bipolar integrated circuits (PEDIC)
[AD-A104657] N82-11367

RADIATION HAZARDS

Goldstone high power radiation control
N82-11308

DARTAB: A program to combine airborne radionuclide environmental exposure data with dosimetric and health effects data to generate tabulations of predicted health impacts
[DE81-030434] N82-11774

RADIATION MEASUREMENT

Radiation balances and the solar constant
[NASA-TM-76612] N82-12016

A review and interpretation of recent cosmic ray beryllium isotope measurements
[NASA-CR-164967] N82-12020

RADIATION SHIELDING

Calculation procedures for the analysis of integral experiments for fusion-reactor design
[DE81-027626] N82-11949

RADIATION TOLERANCE

Processing of silicon solar cells by ion implantation and laser annealing
[NASA-CR-165283] N82-11546

RADIATION TRANSPORT

Calculation procedures for the analysis of integral experiments for fusion-reactor design
[DE81-027626] N82-11949

RADIATIVE TRANSFER

A model describing the microwave emission from a multi-layer snowpack at 37 GHz
[NASA-CR-166708] N82-11510

An evaluation of the spatial resolution of soil moisture information
[NASA-CR-166724] N82-11513

Theoretical studies of chromospheres and winds in cool stars
[NASA-CR-164969] N82-12004

Radiative transfer in cometary dust atmospheres: Critique of recent developments
[NASA-CR-164946] N82-12015

RADIO ALTIMETERS

The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739

RADIO ASTRONOMY

The Telecommunications and Data Acquisition report
[NASA-CR-164939] N82-11279

Radio astronomy N82-11280

Special activity utilization of GDSCC antennas during 1980 N82-11307

RADIO ATTENUATION

Plasmaspheric, faraday and total electron contents, 1977 and 1978
[AD-A104362] N82-11700

RADIO COMMUNICATION

DSN ground communication facility N82-11282

RADIO FREQUENCY HEATING

Antenna-plasma coupling theory for ICRF heating of large Tokamaks
[DE81-029815] N82-11933

RF-driven Tokamak reactor with sub-ignited, thermally stable operation
[DE81-029437] N82-11935

RADIO FREQUENCY INTERFERENCE

Strategies for weather-dependent data acquisition N82-11286

RFI channels, 2 N82-11290

Cryogenic filters for RFI protection N82-11293

Closed form evaluation of symmetric two-sided complex integrals N82-11299

RADIO SOURCES (ASTRONOMY)

Radio astronomy N82-11280

RADIO TELESCOPES

A dedicated 26-m SETI sky survey instrument facility: A feasibility study N82-11281

RADIOACTIVE CONTAMINANTS

Environmental Monitoring Report, Sandia National Labs., Albuquerque, New Mexico, 180
[DE81-027839] N82-11649

Airborne radiological sampling of Mount St. Helens plumes
[PB81-213795] N82-11659

RADIOACTIVE DECAY

Decay heat curve evaluation test
[DE81-027181] N82-11976

RADIOACTIVE ISOTOPES

Environmental Monitoring Report, Sandia National Labs., Albuquerque, New Mexico, 180
[DE81-027839] N82-11649

RADIOACTIVE WASTES

Geochemical controls on trace metal transport in aqueous environmental systems N82-11631

Evaluation of uncertainties in geologic information
[DE81-025997] N82-11714

DARTAB: A program to combine airborne radionuclide environmental exposure data with dosimetric and health effects data to generate tabulations of predicted health impacts
[DE81-030434] N82-11774

Analysis of space systems study for the space disposal of nuclear waste study report. Volume 2: Technical report
[NASA-CR-161888] N82-11889

Comparison of costs for solidification of high-level radioactive waste solutions: Glass monoliths vs. metal matrices
[ANL-80-121] N82-11890

International safeguards for spent fuel storage
[DE81-029896] N82-11892

Uncertainty analysis for geologic disposal of radioactive waste
[DE81-027206] N82-11893

Materials considerations relative to multibarrier waste isolation
[DE81-029104] N82-11894

Use of polyethers in the treatment of acidic high-activity nuclear wastes
[DE81-027087] N82-11895

Evaluation and review of alternative waste forms for immobilization of high-level radioactive wastes
[DE81-026323] N82-11909

RADIOACTIVITY

Preliminary activation calculations for the poloidal divertor experiment
[DE81-026525] N82-11942

RADIOGRAPHY

Standard specification for apparatus for gamma radiography
[SABS-1317-1980] N82-11433

RADIOMETERS

Low-cost solar array project: Four absolute cavity radiometer (pyrheliometer) intercomparisons at New River, Arizona: Radiometer standards
[NASA-CR-164950] N82-11435

RADIOMETRIC RESOLUTION

Antenna pattern modification for single reflector antennas --- smoothing data from scanning microwave radiometers
[NASA-CR-166711] N82-11338

RADIOSONDES

US Monsoon Experiment MONEX rawinsonde/radiometersonde system
[PB81-222937] N82-11736

RAILGUN ACCELERATORS

Performance of a 100-kV, 78kJ electric-gun system
[DE81-025603] N82-11374

RAIN

An evaluation of the spatial resolution of soil moisture information
[NASA-CR-166724] N82-11513

A systems approach to the real-time runoff analysis with a deterministic rainfall-runoff model
[PB81-224495] N82-11530

Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado
[PB81-224313] N82-11667

Some analysis on the diurnal variation of rainfall over the Atlantic Ocean
[NASA-CR-164937] N82-11724

An assessment of detecting mesoscale rainfall from mid-latitude cyclones using GOES imagery data
[AD-A104377] N82-11726

The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737

The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738

Comparison of ocean and island rainfall in the tropical South Pacific, Atlantic, and Indian Oceans
[PB81-225401] N82-11745

RAMAN SPECTRA

Stimulated Raman scattering in large plasmas
[DE81-026589] N82-11938

Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967

RAMAN SPECTROSCOPY
Development of inverse Raman spectroscopy for probing rapidly decomposing explosives and propellants
[AD-A104382] N82-11226
Stimulated Raman studies of CO2-laser-excited SF6
[DE81-025829] N82-11463
RAMJET ENGINES
An investigation of the combustion process in solid fuel ramjets
[AD-A104603] N82-11232
RANDOM ACCESS MEMORY
The Crosstie Random Access Memory (CRAM). Part 1: The concept and initial studies
[AD-A104543] N82-11788
RANDOM ERRORS
Random error propagation analysis in the plume diagnostic code EMABIC
[AD-A104495] N82-11112
RANDOM NOISE
The R sub 0 parameter for the Gaussian channel N82-11291
Numerical differentiation of noisy data
[AD-A104631] N82-11831
RANDOM SAMPLING
Generalized L-, M- and R-statistics
[AD-A104480] N82-11835
RANDOM VARIABLES
A note on a nonparametric maximum penalized likelihood estimator of the probability density function of a positive random variable. AMPLE with positive support
[AD-A104476] N82-11836
RANDOM WALK
Bounded limit for the Monte Carlo point-flux-estimator
[DE81-026526] N82-11883
RANGEFINDING
Estimation of radar range biases at multiple sites
[AD-A104306] N82-11346
RANKINE CYCLE
Light-commercial Brayton/Rankine space-conditioning system
[DE81-024137] N82-11586
RANKING
A two-step approach to finite element ordering
[AD-A104320] N82-11827
RARE EARTH COMPOUNDS
Surface analysis by Fourier transform infrared (Ftir) spectroscopy
[DE81-025741] N82-11150
RARE EARTH ELEMENTS
High-pressure optical studies
[DE81-025577] N82-11918
RARE GAS-HALIDE LASERS
Conceptual design of an angular multiplexed rare gas halide laser fusion driver
[DE81-029900] N82-11458
RAWINSONDES
US Monsoon Experiment MONEX rawinsonde/radiometersonde system
[PB81-222937] N82-11736
RAY TRACING
Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers
[PB81-224610] N82-11920
RAYLEIGH WAVES
Waves guided by a thin viscoelastic layer between elastic solids N82-11129
RCA SATCOM SATELLITES
Mission operation report: RCA-D/Delta launch
[NASA-TM-84063] N82-11102
REACTION KINETICS
Studies of the kinetics and mechanism of gas-surface reactions on metal and metal oxide surfaces N82-11140
Laboratory study for removal of organic sulfur from coal
[DE81-025132] N82-11239
Solvent-Refined-Coal (SRC) process
[DE81-029628] N82-11268
Kinetics of NO/ sub x formation during early stages of pulverized-coal combustion
[DE81-029071] N82-11641
On electron beam ionization of air and chemical reactions for disturbed air deionization
[AD-A104517] N82-11871
Reaction of oxygen atoms with ethylene and vinylbromide
[DE81-025206] N82-11879
REACTION PRODUCTS
Reaction of oxygen atoms with ethylene and vinylbromide
[DE81-025206] N82-11879
REACTOR CORES
KUGEL: A thermal, hydraulic, fuel performance and gaseous fission product release code for pebble bed reactor core analysis
[DE81-026561] N82-11904
REACTOR DESIGN
Advanced-gasification processes
[DE81-030184] N82-11254
Engineering approach for elastic-plastic fracture analysis
[DE81-904218] N82-11502
Engineering challenges of fusion-reactor development
[DE81-024129] N82-11907
Calculation procedures for the analysis of integral experiments for fusion-reactor design
[DE81-027626] N82-11949
Physics considerations for the FED limiter
[DE81-027596] N82-11950
REACTOR MATERIALS
Design of refractories for resistance to high-temperature erosion-corrosion
[DE81-904208] N82-11217
Trap activation model for hydrogen retention and isotope exchange in some refractory materials
[DE81-025995] N82-11221
Engineering approach for elastic-plastic fracture analysis
[DE81-904218] N82-11502
Coated-limiter testing in Tokamaks
[DE81-027665] N82-11951
REACTOR PHYSICS
Source-to-incident-flux relation in a Tokamak blanket module
[DE81-026524] N82-11941
REACTOR TECHNOLOGY
Magnets for the Tandem Mirror Fusion Power Reactor WITAMIR-I
[DE81-025568] N82-11954
REAL TIME OPERATION
Architecture tuning of a real-time signal sorter in a dense environment
[AD-A104524] N82-11787
Multiple-instruction, multiple-data path computers: Parallel processing impact on flight simulation software
[AD-A104506] N82-11789
GRAMPS: A graphics language interpreter for real time, interactive, three dimensional picture editing and animation
[DE81-027398] N82-11811
Engineering Analysis System (EASY)
[DE81-027508] N82-11846
Automated water monitor system field demonstration test report. Volume 1: Executive summary
[NASA-CR-166228] N82-11991
Automated water monitor system field demonstration test report. Volume 2: Technical summary
[NASA-CR-166229] N82-11992
RECEIVERS
An error budget for the JPL hydrogen maser receiver N82-11297
RECHARGING
Rechargeable molten-salt cells
[DE81-027091] N82-11595
RECIRCULATIVE FLUID FLOW
Research on the recirculating flow rate in the wake of two-dimensional flame stabilizers (under cold conditions) N82-11028
RECTANGLES
Surface-tension induced instabilities: Effects of lateral boundaries
[NASA-CR-165530] N82-11390
RECURSIVE FUNCTIONS
Recursive aspects of the theory of real closed fields N82-11849
RECYCLING
SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board
[DE81-903377] N82-11615
REDOX CELLS
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607
REDUCTION (CHEMISTRY)
Oxygen reduction on carbon-supported platinum fuel-cell electrodes in H sub 3 Po sub 4
[DE81-027303] N82-11582
REDUNDANCY
Management of redundancy in flight control systems using optimal decision theory N82-11084
REENTRY EFFECTS
Analytical studies of high-pressure MHD accelerators --- applications to a reentry vehicle test facility
[AD-A104686] N82-11930
REFINING
Solvent-Refined-Coal (SRC) process
[DE81-029628] N82-11268
Sulfur pollution control. Phase 1: The disposal program (sections 5 through 7)
[PB81-222804] N82-11655
REFLECTANCE
The opposition effect of particulate mineral surfaces and condensates: Applications to Saturn's rings N82-12014
REFLECTION
Photoelectric surface brightness observations and the geometry of reflection nebulae N82-12002
REFLEXES
Otolithic reflex and space perception function of cosmonauts N82-11764
REFRACTIVITY
Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers
[PB81-224610] N82-11920
REFRACTORIES
Design of refractories for resistance to high-temperature erosion-corrosion
[DE81-904208] N82-11217
REFRACTORY MATERIALS
Physical characterization of electronic materials
[AD-A104494] N82-11135
Materials technology for coal-conversion processes
[DE81-028474] N82-11169
Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182
Castable high temperature fractory materials
[NASA-CASE-LEW-13080-2] N82-11210
REGIONAL PLANNING
National coal-market conditions for the year 2000: Regional-issue identification and analysis, high scenario
[DE81-026425] N82-11988
REGRESSION ANALYSIS
Projection pursuit methods for data analysis
[DE81-027493] N82-11842
REGULATIONS
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 6: Innovation by regulation: The administration of control technology requirements under the Clean Air Act
[PB81-221616] N82-11664
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 7: Periodic review and technological escalation of performance standards: New source performance standards review process
[PB81-218117] N82-11665
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 8: Controlled trading and site-specific SIP revisions: Competing for attention in a crowded administrative route
[PB81-218273] N82-11666
Information of mission and functions of the National Bureau of Standards
[PB81-228207] N82-11761
REINFORCED SHELLS
Fabrication and wear test of a continuous fiber/particulate composite total surface hip replacement
[NASA-TM-81746] N82-11211
RELATIVISTIC ELECTRON BEAMS
Heating of a dense plasma with an intense relativistic electron beam: Initial observations
[DE81-025348] N82-11945
RELATIVISTIC PLASMAS
Theory of electron cyclotron heating in the Constance 2 experiment
[DE81-028269] N82-11906

Symmetries of the nonlinear conductivity for a relativistic turbulent plasma
[AD-A104544] N82-11931
RELATIVITY
Finite temperature relativistic magnetohydrodynamic winds N82-11923
RELIABILITY
Recent advances in statistical methods for system reliability using Bernoulli sampling of components
[AD-A104436] N82-11482
Feasible objective confidence bounds for system reliability
[AD-A104260] N82-11483
RELIABILITY ENGINEERING
Liquid oxygen turbopump technology
[NASA-CR-165487] N82-11468
REMOTE SENSING
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635
Laser induced fluoroescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758
Inclusion of a simple vegetation layer in terrain temperature models for thermal infrared (IR) signature prediction
[AD-A104469] N82-11910
REMOTE SENSORS
Technology transfer of NASA microwave remote sensing system
[NASA-CR-165791] N82-11515
REMOTELY PILOTED VEHICLES
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
REMOVAL
Removal of drift from frequency stability measurements N82-11298
REPORTS
Writing effective reports
[PB81-214645] N82-11983
REQUIREMENTS
Data base specifications for the OPAQUE program
[AD-A104340] N82-11709
RESEARCH FACILITIES
National Center for Atmospheric Research
[NCAR/AR-80] N82-11692
RESEARCH MANAGEMENT
Environmental research plan for gas supply technologies. Volume 2: Environmental research plan
[PB81-222317] N82-11274
Report on research at AFGL
[AD-A104513] N82-11704
Information of mission and functions of the National Bureau of Standards
[PB81-228207] N82-11761
Unique characteristics of financing science in the USSR
[PB81-212243] N82-11980
RESERVOIRS
Flow routing in the Susquehanna River Basin: Part 4 - routing reservoir releases in the eastern Susquehanna River Basin in New York State
[PB81-221533] N82-11533
RESIDENTIAL AREAS
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636
RESIDENTIAL ENERGY
Sampling design for the 1980 commercial and multifamily residential building survey
[DE81-028783] N82-11320
User needs for solar decision-making tools: The homebuilding industry
[DE81-027293] N82-11325
Well-water-source heat pump field performance study
[DE81-024136] N82-11419
Data collection and processing for the ACES --- annual cycle energy system demonstration house
[DE81-030630] N82-11555
Solar energy system performance evaluation: Forest City Dillon, Washington, D.C., January 1980 - December 1980
[DE81-028174] N82-11560
Solar energy system performance evaluation: Montecito Pines, Santa Rosa, California, November 1979 - April 1980
[DE81-028175] N82-11561
Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568
International comparison of residential energy use: Indicators of residential energy use and efficiency. Part 1: The data base
[DE81-028550] N82-11592
SOLPLAN report: An assessment of barriers and incentives to conservation and alternative-energy use in the residential sector in Wisconsin
[DOE/CS-30292/3] N82-11614
RESISTANCE HEATING
Energy losses in conductors carrying very high currents
[DE81-025367] N82-11373
RESOLUTION
Study and development of an integrated head-up display
[AD-A104337] N82-11062
RESONANCE
Scientific innovation and resonance ionization spectroscopy
[DE81-023193] N82-11157
RESONANCE SCATTERING
Use of nuclear resonant scattering of Gamma rays for in vivo measurement of iron
[DE81-026051] N82-11775
RESONANT FREQUENCIES
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 1: Investigation of resonance extraction procedures --- for target recognition
[AD-A104530] N82-11350
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 2: Appendices --- for target recognition
[AD-A104531] N82-11351
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 3: Translation of Prony's method --- for target recognition
[AD-A104532] N82-11352
RESOURCES MANAGEMENT
Energy analysis of human ecosystems in an Appalachian coal county
[DE81-025177] N82-11574
The planning and management of California's coastal resources
[PB81-224057] N82-11670
Urban ecosystem and resource-conserving urbanism in Third World cities
[DE81-029854] N82-11995
RESPIRATION
Low-Btu-gasifier emissions toxicology
[DE81-031000] N82-11651
Airway gas mixing during rest and bicycle exercise N82-11768
RESPIRATORY IMPEDANCE
New approaches to quantitating the pulmonary effects on inhaled pollutants
[PB81-222382] N82-11778
RESPIRATORY PHYSIOLOGY
Airway gas mixing during rest and bicycle exercise N82-11768
RESPIRATORY SYSTEM
New approaches to quantitating the pulmonary effects on inhaled pollutants
[PB81-222382] N82-11778
REST
Airway gas mixing during rest and bicycle exercise N82-11768
RETENTION (PSYCHOLOGY)
Time and information model of human Memory Organization N82-11763
RETROFITTING
An evaluation of three-way control single and dual bed catalysts as applied to heavy-duty gasoline engines
[PB81-224982] N82-11477
EPA evaluation of the FUEL-MAX device under Section 511 of the Motor Vehicle Information and Cost Savings Act
[PB81-229866] N82-11479
EPA evaluation of the Automotive Cylinder Deactivator System (ACDS) under Section 511 of the Motor Vehicle Information and Cost Saving Act
[PB81-228256] N82-11480
REYNOLDS NUMBER
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
REYNOLDS STRESS
Numerical simulation of a compressible homogeneous, turbulent shear flow
[NASA-CR-164953] N82-11396
RHEOLOGY
Studies for the stabilization of coal-oil mixtures
[DOE/ET-10746/T1] N82-11156
Chemorheology and quality control for an adhesive
[AD-A104556] N82-11215
RHODE ISLAND
Planning a comprehensive program for exploration of the anthracite deposits of the Narragansett Basin of Massachusetts and Rhode Island, phase 1 and 2
[DE81-028490] N82-11519
Exploration of coal and anthracitic carbonaceous shale resources, Narragansett Basin, Massachusetts, and Rhode Island
[DE81-030895] N82-11523
RIBBONS
Manufacturing methods and technology engineering for tape chip carrier
[AD-A104393] N82-11365
RIBONUCLEIC ACIDS
Molecular events basic to cellular radiation response
[DE81-027898] N82-11776
RICHARDSON NUMBER
Three-dimensional lee waves in a continuously stratified fluid N82-11387
RIEMANN MANIFOLD
Special functions and harmonic analysis on P sub n N82-11824
RIGID STRUCTURES
Magnetic bearings
[DE81-024201] N82-11473
RING LASERS
Theoretical analysis of effect of Langmuir flow in ring laser N82-11447
RIVER BASINS
Water resources data for Ohio, water year 1980. Volume 2: St. Lawrence River basin
[PB81-217077] N82-11528
Geology of the nahcolite deposits and associated oil shales of the Green River Formation in the Piceance Creek Basin, Colorado N82-11683
RIVERS
Bearing capacity and characterization of compressible Clayey and Silty Foundation soils in Oklahoma
[PB81-231607] N82-11330
Raft River geothermal project groundwater monitoring program
[DE81-030202] N82-11521
Flow routing in the Susquehanna River Basin: Part 4 - routing reservoir releases in the eastern Susquehanna River Basin in New York State
[PB81-221533] N82-11533
Waste-assimilation capacity of the Arkansas River in Pueblo County, Colorado, as it relates to water-quality guidelines and stream classification
[PB81-227340] N82-11540
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 1
[PB81-225286] N82-11675
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 2
[PB81-225294] N82-11676
ROCKET EXHAUST
Random error propagation analysis in the plume diagnostic code EMABIC
[AD-A104495] N82-11112
ROCKET LAUNCHING
Mission operation report: RCA-D/Delta launch
[NASA-TM-84063] N82-11102
ROCKET TEST FACILITIES
Analytical studies of high-pressure MHD accelerators --- applications to a reentry vehicle test facility
[AD-A104686] N82-11930
ROCKS
Electrical conductivity structure of the San Andreas fault in central California N82-11686

ROLLER BEARINGS
Thermal and chemical effects in high pressure rolling/sliding contacts
[AD-A104473] N82-11471
ROOFS
Assessment of roofing research
[DE81-027077] N82-11322
ROTARY WINGS
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Operational environment, meteorological conditions and weather forecasting N82-11057
Technology base for icing instrumentation and mathematical modelling N82-11058
Facilities for development and clearance N82-11059
Ice protection system technology N82-11060
Proposed standard requirements and procedures for icing clearance N82-11061
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
Helicopter rotor trailing edge noise — noise prediction
[NASA-CR-3470] N82-11859
ROTATING BODIES
Shear flow instabilities in a rotating system N82-11388
Magnetic bearings
[DE81-024201] N82-11473
ROTATING FLUIDS
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor N82-11025
Shear flow instabilities in a rotating system N82-11388
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
ROTATION
System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861
ROTOR AERODYNAMICS
Yawing of wind turbines with blade cyclic pitch variation
[DE81-030091] N82-11045
RUNWAYS
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Probabilistic modeling of subgrade soil strengths
[AD-A104336] N82-11315
RURAL AREAS
Project demonstration of wind-turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE81-030950] N82-11380
RUTHENIUM
Transportation fuels from synthetic gas
[DE81-029614] N82-11258

S

S WAVES
Finite element analysis of the split Hopkinson bar
[DE81-030387] N82-11503
SAFETY
International safeguards for spent fuel storage
[DE81-029896] N82-11892
SAFETY DEVICES
Standard specification for industrial safety-belt assemblies
[SABS-809-1980] N82-11278
SAFETY FACTORS
Preliminary activation calculations for the poloidal divertor experiment
[DE81-026525] N82-11942
SAFETY MANAGEMENT
Side impact sled and padding development
[PB81-217952] N82-11092
System safety program plan — electromagnetic pulse testing of the A-7E aircraft
[AD-A104557] N82-11354
SALYUT SPACE STATION
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097
SAMOA
The wind climatology of American Samoa
[PB81-221012] N82-11733
SAMPLERS
An inexpensive, portable vibracoring system for shallow-water and land application
[AD-A104323] N82-11314
SAMPLING
Techniques for geothermal liquid sampling and analysis
[DE81-030151] N82-11149
Sampling design for the 1980 commercial and multifamily residential building survey
[DE81-028783] N82-11320
Recent advances in statistical methods for system reliability using Bernoulli sampling of components
[AD-A104436] N82-11482
Feasible objective confidence bounds for system reliability
[AD-A104260] N82-11483
Conditional sampling of oceanic temperature and pressure
[AD-A104539] N82-11751
SAN ANDREAS FAULT
Electrical conductivity structure of the San Andreas fault in central California N82-11686
SANDS
Critical wave conditions for sand motion initiation
[AD-A104376] N82-11400
SAPPHIRE
Evaluation of the effects of solar radiation on glasses
[NASA-CR-161907] N82-11207
SATELLITE ATTITUDE CONTROL
On the shape and orientation control of an orbiting shallow spherical shell structure — shape and orientation control of large dish type receivers/reflectors
[NASA-CR-164970] N82-11100
SATELLITE OBSERVATION
The use of DMSP digital data for auroral measurements
[AD-A104392] N82-11707
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738
SATELLITE SOLAR ENERGY CONVERSION
Investigation of direct solar-to-microwave energy conversion techniques
[NASA-CR-161883] N82-11544
SATELLITE SURFACES
The morphology and evolution of Ganymede and Callisto N82-12013
SATELLITE-BORNE INSTRUMENTS
Magnetic Field Investigation for ISEE mother and daughter spacecraft — magnetometer design, capability, and results
[NASA-CR-166713] N82-11105
SATURATION (CHEMISTRY)
Analysis of saturated solar pond characteristics, volume 1
[DE81-030820] N82-11618
SATURN RINGS
The opposition effect of particulate mineral surfaces and condensates: Applications to Saturn's rings N82-12014
SCALARS
Theoretical investigation of a passive scalar such as temperature in isotropic turbulence N82-11386
Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394
SCALE (RATIO)
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183
SCALE MODELS
Acoustic scaling: A review of progress to date, and of possible future development
[BBC-RD-1981/6] N82-11855
SCALING LAWS
Acoustic scaling: A review of progress to date, and of possible future development
[BBC-RD-1981/6] N82-11855
Scalability of light ion beams to reach fusion conditions
[DE81-024443] N82-11953
SCATTERING COEFFICIENTS
A model describing the microwave emission from a multi-layer snowpack at 37 GHz
[NASA-CR-166708] N82-11510
SCATTERING CROSS SECTIONS
Elastic and inelastic psi production by muons
[DE81-025326] N82-11877
SCHEDULING
Goldstone high power radiation control N82-11308
SCHLIEREN PHOTOGRAPHY
The wave diagrams for diffraction and reflection of a traveling weak shock wave from an open end of a shock tube N82-11017
SCHOTTKY DIODES
A study of metal-semiconductor contacts on indium phosphide
[AD-A104439] N82-11965
SCORING
Scriber for silicon wafers
[NASA-CASE-NPO-15539-1] N82-11469
SEA WATER
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls
[DE81-029953] N82-11190
Development of the coastal zone color scanner for NIMBUS 7. Volume 1: Mission objectives and instrument description
[NASA-CR-166720-VOL-1] N82-11511
SEALS (STOPPERS)
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals
[NASA-CR-165479] N82-11466
SEARCH PROFILES
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795
SEARCH RADAR
Threat Alert and Collision Avoidance System (TCAS) Symposium
[AD-A104563] N82-11047
SEDIMENT TRANSPORT
Critical wave conditions for sand motion initiation
[AD-A104376] N82-11400
SEDIMENTS
Beach foreshore sedimentation by organic and inorganic processes N82-11630
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669
Use of a vegetative filter zone to control fine-grained sediments from surface mines
[PB81-226110] N82-11674
An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857
SEISMIC WAVES
Finite element analysis of the split Hopkinson bar
[DE81-030387] N82-11503
Local earthquake travel times and spatial variations of crustal velocity in southern California N82-11687
SEISMOGRAPHS
Recovery of seismic signals in noise by adaptive processing
[DE81-029469] N82-11713
SEISMOLOGY
The quantitative recognition and evaluation of seismic quiescence: Applications to earthquake prediction and subduction zone tectonics N82-11682
COCORP traverses in Wyoming and Oklahoma N82-11684
Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas — Texas and Northern Chihuahua, Mexico
[NASA-CR-164964] N82-11695
SELF DIFFUSION (SOLID STATE)
Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron
[DE81-025540] N82-11973
SELF ERECTING DEVICES
Study of foldable elastic tubes for large space structure applications, phase 3
[NASA-CR-164929] N82-11493
SEMICONDUCTOR DEVICES
Semiconductor measurement technology ARPA/NBS Workshop Moisture Measurement Technology for Hermetic Semiconductor Devices
[PB81-220733] N82-11384

Semiconductor measurement technology: The relationship between resistivity and dopant density for phosphorus and boron doped silicon
[PB81-221327] N82-11975

SEMICONDUCTOR JUNCTIONS
Interface reactions in Mg/Zn3P2 solar cells
[DE81-025773] N82-11597

SEMICONDUCTORS (MATERIALS)
Physical characterization of electronic materials
[AD-A104494] N82-11135
Dislocation induced noises in semiconductors at low and high temperatures
[AD-A104449] N82-11960
Laser excitation of surface electronic states for a one-dimensional semiconductor
[AD-A104522] N82-11964

SENSITIVITY
Sensitivity theory for nonlinear systems. 2: Extensions to additional classes of responses
[DE81-030258] N82-11845

SENSITIZING
Vibrational sensitization of of 14N14NO, 15N14NO and H2O by laser excited SF6 N82-11143

SEPARATED FLOW
Development of prediction method for transonic shock induced separated flow
[AD-A104566] N82-11403

SEPARATORS
Static continuous electrophoresis device
[NASA-CASE-MFS-25306-1] N82-11147
Laboratory study for removal of organic sulfur from coal
[DE81-025132] N82-11239
Development of battery separator composites
[NASA-CR-165508] N82-11547

SEQUENCING
Altered tissue reactivity and interactions between chemicals
[DE81-023189] N82-11777

SERIES (MATHEMATICS)
A general moment inequality for the maximum of rectangular partial sums of multiple series
[AD-A104475] N82-11828

SERIES EXPANSION
Estimation problems associated with the Weibull distribution
[DE81-030466] N82-11841

SEWAGE
Preliminary development of a technique for estimating municipal-solid-waste generation
[DE81-024152] N82-11590

SEWAGE TREATMENT
Sewage sludge additive
[NASA-CASE-NPO-13877-1] N82-11634

SHAFTS (MACHINE ELEMENTS)
Failure analysis of a tool steel torque shaft
[NASA-TM-82758] N82-11184

SHALE OIL
Jet fuel locks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
Assessment of oil-shale technology in Brazil
[DE81-027574] N82-11249
Geology of the nahcolite deposits and associated oil shales of the Green River Formation in the Piceance Creek Basin, Colorado N82-11683

SHALES
Aluminum recovery from fly ash and shale-retort wastes
[DE81-027675] N82-11154
Exploration of coal and anthracitic carbonaceous shale resources, Narragansett Basin, Massachusetts, and Rhode Island
[DE81-030895] N82-11523

SHALLOW SHELLS
On the shape and orientation control of an orbiting shallow spherical shell structure --- shape and orientation control of large dish type receivers/reflectors
[NASA-CR-164970] N82-11100

SHALLOW WATER
An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857

SHAPE CONTROL
On the shape and orientation control of an orbiting shallow spherical shell structure --- shape and orientation control of large dish type receivers/reflectors
[NASA-CR-164970] N82-11100

SHATTER CONES
A review of an attempt to create shatter cones with magnetic flyer plate technology
[NASA-CR-164614] N82-11492

SHEAR FLOW
Shear flow instabilities in a rotating system N82-11388
Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394
Numerical simulation of a compressible homogeneous, turbulent shear flow
[NASA-CR-164953] N82-11396

SHEAR STRENGTH
The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics
[RAE-LIB-TRANS-2052] N82-11205
Quasi-elastic high-pressure waves in 2024 Al and Cu
[DE81-025334] N82-11971

SHEAR STRESS
An improved transverse shear deformation theory for laminated antisotropic plates
[NASA-TP-1903] N82-11488
A review of an attempt to create shatter cones with magnetic flyer plate technology
[NASA-CR-164614] N82-11492

SHIVA LASER SYSTEM
High energy density capacitor testing for the AFWL SHIVA
[DE81-023688] N82-11379

SHOCK ABSORBERS
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212

SHOCK LOADS
Shock-induced organic chemistry
[DE81-024442] N82-11115
Shock effects in particle-beam fusion targets
[DE81-027806] N82-11952

SHOCK TESTS
Correlation of shock-initiation tests for explosives and propellants
[DE81-026533] N82-11264

SHOCK TUBES
Numerical computation and analysis of the flow field in a large shock tube with a variable cross-sectional area N82-12026

SHOCK WAVE GENERATORS
Performance of a 100-kV, 78kJ electric-gun system
[DE81-025603] N82-11374

SHOCK WAVE INTERACTION
Ionization fluctuations in collisional ionizing shock waves --- plasma interactions N82-11864

SHOCK WAVE PROFILES
Shock compression of beryllium
[DE81-024062] N82-11200
Upwind difference schemes for hyperbolic systems of conservation laws N82-11820
Quasi-elastic high-pressure waves in 2024 Al and Cu
[DE81-025334] N82-11971

SHOCK WAVE PROPAGATION
Acta mechanica sinica
[AD-A105184] N82-11014
The wave diagrams for diffraction and reflection of a traveling weak shock wave from an open end of a shock tube N82-11017
Constitutive modelling for the shock physicist
[DE81-024063] N82-11854
Acta Mechania Sinica
[AD-A105635] N82-12021
Numerical computation and analysis of the flow field in a large shock tube with a variable cross-sectional area N82-12026

SHOCK WAVES
Shock-induced organic chemistry
[DE81-024442] N82-11115
Development of prediction method for transonic shock induced separated flow
[AD-A104566] N82-11403
One-dimensional magnetohydrodynamic calculations of a hydrogen-gas puff
[UCRL-85867] N82-11940

SHORELINES
Beach foreshore sedimentation by organic and inorganic processes N82-11630

SIDELOBES
Antenna pattern modification for single reflector antennas --- smoothing data from scanning microwave radiometers
[NASA-CR-166711] N82-11338

SIDES
Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing
[AD-A104562] N82-11402

SIGNAL ANALYZERS
Architecture tuning of a real-time signal sorter in a dense environment
[AD-A104524] N82-11787

SIGNAL GENERATORS
Motor power factor controller with a reduced voltage starter
[NASA-CASE-MFS-25586-1] N82-11360

SIGNAL PROCESSING
Special activity utilization of GDSCC antennas during 1980 N82-11307
Modulation/demodulation techniques for satellite communications. Part 4: Appendices
[NASA-CR-164954] N82-11341
Fourier analysis of broadband, low-level signals using switched inputs
[AD-A104588] N82-11353
Binary/analog CCD correlator development
[AD-A104438] N82-11363
Architecture tuning of a real-time signal sorter in a dense environment
[AD-A104524] N82-11787

SIGNAL RECEPTION
Virtual center arraying N82-11287

SIGNAL TO NOISE RATIOS
Symbol error rate performance evaluation of the LM37 multimegabit telemetry modulator-demodulator unit N82-11289
Recovery of seismic signals in noise by adaptive processing
[DE81-029469] N82-11713

SIGNATURE ANALYSIS
Random error propagation analysis in the plume diagnostic code EMABIC
[AD-A104495] N82-11112
Vibration signature analysis and acoustic-emission monitoring at Brayton Point
[DE81-904232] N82-11507

SILANES
Thermal control coatings based on trialkoxysilane hydrolysate binders --- tolerance to ultraviolet radiation in vacuum
[NASA-CASE-MFS-25620-1] N82-11118
Impurity effects in a-Si:H solar cells
[DE81-025069] N82-11575

SILICA GLASS
Space processing of electronic materials --- determining ther thermal conductivity of mercury cadmium tellurides and furnace design
[NASA-CR-161892] N82-11094
A structural study of aluminosilicate glasses by Raman spectroscopy N82-11138
Evaluation of the effects of solar radiation on glasses
[NASA-CR-161907] N82-11207

SILICON
Scriber for silicon wafers
[NASA-CASE-NPO-15539-1] N82-11469
The effects of impurities on the performance of silicon solar cells
[NASA-CR-164945] N82-11548
Growth of silicon sheets from metallurgical-grade silicon
[DE81-025703] N82-11605
Negative-U for point defects in silicon
[AD-A104482] N82-11966
Semiconductor measurement technology: The relationship between resistivity and dopant density for phosphorus and boron doped silicon
[PB81-221327] N82-11975

SILICON ALLOYS
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027254] N82-11558
Impurity effects in a-Si:H solar cells
[DE81-025069] N82-11575

SILICON CARBIDES
Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76608] N82-11120

The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics [RAE-LIB-TRANS-2052] N82-11205

SILICON DIOXIDE

Castable high temperature fractory materials [NASA-CASE-LEW-13080-2] N82-11210

Trapping and release of implanted D/H ions in fused silica [DE81-024441] N82-11974

SILICON OXIDES

Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics [DE81-030423] N82-11218

SILICONES

Stress relaxation of cellular silicone material: 1981 [DE81-030692] N82-11137

SILVER COMPOUNDS

Advanced selenide thermoelectric development program [DE81-027823] N82-11562

SILVER ZINC BATTERIES

Development of battery separator composites [NASA-CR-165508] N82-11547

SIMPLEX METHOD

Projected Newton methods and optimization of multicommodity flows [AD-A104419] N82-11844

SIMULATION

Validation of a Monte Carlo simulation of binary time series [AD-A104525] N82-11838

SIMULATORS

Solar heat pump simulator [DE81-024368] N82-11583

SINGLE CRYSTALS

Growth of solid solution single crystals --- mercury cadmium tellurides [NASA-CR-161891] N82-11958

SITE SELECTION

Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities [DE81-025518] N82-11240

Relocation of the Deep Space Network Maintenance Center N82-11305

Site selection for small wind energy conversion systems for US Department of Energy field evaluation program [PB81-226862] N82-11624

SIZE DETERMINATION

Small conductive particle sensor --- microfiber size determination [NASA-CASE-LAR-12552-1] N82-11431

SKIN (ANATOMY)

Mechanical impedance of the human outer ear [RAE-LIB-TRANS-2065] N82-11767

SKY BRIGHTNESS

Application of visible monochromatic auroral imaging data for modeling infrared Earth-limb morphology [AD-A104343] N82-11706

SLABS

Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations [AD-A104545] N82-11498

Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program [AD-A104546] N82-11499

Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program [AD-A104547] N82-11500

SLAGS

Mass spectrometric studies of MHD slag thermochemistry [PB81-221434] N82-11173

SLEDS

Side impact sled and padding development [PB81-217952] N82-11092

SLICING

Scriber for silicon wafers [NASA-CASE-NPO-15539-1] N82-11469

SLIDING FRICTION

Thermal and chemical effects in high pressure rolling/sliding contacts [AD-A104473] N82-11471

SLUDGE

Production and utilization of methane from anaerobic sludge digestion in U.S. wastewater-treatment plants [DE81-029958] N82-11246

Sewage sludge additive [NASA-CASE-NPO-13877-1] N82-11634

SLURRIES

Transport characteristics of alternate slurry fuels [DE81-028580] N82-11255

SMELTING

Sulfur pollution control. Phase 1: The disposal program [PB81-222612] N82-11652

SNOW

Performance assessments of precipitation gages for snow measurement [PB81-218547] N82-11443

A model describing the microwave emission from a multi-layer snowpack at 37 GHz [NASA-CR-166708] N82-11510

SOCIAL FACTORS

Near-term goals for alcohol fuels from biomass: An overview of resource requirements, land use, environmental, and socioeconomic impacts --- ethyl alcohol production [DE81-029987] N82-11245

Energy analysis of human ecosystems in an Appalachian coal county [DE81-025177] N82-11574

SODAR

Instrument intercomparisons at the Boulder Atmospheric Observatory during 1980 [PB81-220139] N82-11740

SODIUM CHLORIDES

Optical transparency of inexpensive salt solutions for construction of density-gradient ponds [DE81-030832] N82-11559

SODIUM HYDROXIDES

Laboratory study for removal of organic sulfur from coal [DE81-025132] N82-11239

SOIL MECHANICS

Design of airport pavements for expansive soils [AD-A104660] N82-11313

Probabilistic modeling of subgrade soil strengths [AD-A104336] N82-11315

Bearing capacity and characterization of compressible Clayev and Silty Foundation soils in Oklahoma [PB81-231607] N82-11330

A review of the behaviour and engineering properties of carbonate soils [PB81-226722] N82-11331

SOIL MOISTURE

Studies of heat transfer and water migration in soils [DE81-023951] N82-11425

An evaluation of the spatial resolution of soil moisture information [NASA-CR-166724] N82-11513

SOILS

Design of airport pavements for expansive soils [AD-A104660] N82-11313

Design, operation and performance of a ground coupled heat pump system in a cold climate [DE81-024257] N82-11412

Investigation of direct expansion in ground source heat pumps [DE81-024139] N82-11418

Effects of acid precipitation on cation transport in New Hampshire forest soils [DE81-027494] N82-11648

Geothermal environmental assessment: Behavior of selected geothermal brine contaminants in plants and soils [PB81-222333] N82-11671

Geothermal environmental assessment baseline study: Vegetation and soils of the Roosevelt Hot Springs geothermal resource area [PB81-223299] N82-11717

SOLAR ARRAYS

Voltage gradients in solar array cavities as possible breakdown sites in spacecraft-charging-induced discharges [NASA-TM-82710] N82-11107

Solar cell development for the power extension package [NASA-TM-82685] N82-11551

Mississippi County Community College solar photovoltaic project [DE81-030669] N82-11554

Non-solar power tests at the Central Receiver Test Facility (CRTF) [DE81-026955] N82-11604

SOLAR CELLS

Processing of silicon solar cells by ion implantation and laser annealing [NASA-CR-165283] N82-11546

The effects of impurities on the performance of silicon solar cells [NASA-CR-164945] N82-11548

Solar cell development for the power extension package [NASA-TM-82685] N82-11551

Cadmium sulfide/copper sulfide heterojunction cell research by sputter deposition [DE81-026219] N82-11553

Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells [DE81-027234] N82-11557

Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells [DE81-027254] N82-11558

Impurity effects in a-Si:H solar cells [DE81-025069] N82-11575

Zn3P2 as an improved semiconductor for photovoltaic solar cells [DE81-025587] N82-11577

Interface reactions in Mg/Zn3P2 solar cells [DE81-025773] N82-11597

Thin-film polycrystaline silicon solar cells: Progress and problems [DE81-025704] N82-11608

National photovoltaic program in amorphous materials [DE81-025906] N82-11609

Analysis of indium-phosphide/indium tin oxide solar cells [DE81-025907] N82-11610

SOLAR COLLECTORS

Fracture mechanics of cellular glass [NASA-CR-164959] N82-11209

Irrigation market for solar thermal parabolic dish systems [NASA-CR-164955] N82-11549

Secondary and compound concentrators for parabolic dish solar thermal power systems [NASA-CR-164960] N82-11550

Solar energy system performance evaluation: Forest City Dillon, Washington, D.C., January 1980 - December 1980 [DE81-028174] N82-11560

Solar energy system performance evaluation: Montecito Pines, Santa Rosa, California, November 1979 - April 1980 [DE81-028175] N82-11561

Design, cost and performance comparisons of several solar thermal systems for process heat. Volume 1: Executive summary [DE81-029881] N82-11576

Low-cost solar flat-plate-collector development [DE81-025081] N82-11584

Controls for solar heating and cooling [DE81-025209] N82-11593

Test results and analysis of a convective loop solar air collector [DE81-028151] N82-11599

Performance testing of the TOLTEC TI-410 concentrating solar collector [DE81-029994] N82-11617

The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute [PB81-226813] N82-11625

SOLAR CONSTANT

Radiation balances and the solar constant [NASA-TM-76612] N82-12016

SOLAR COOLING

Controls for solar heating and cooling [DE81-025209] N82-11593

Analysis of solar desiccant systems and concepts [DE81-023027] N82-11612

SOLAR CORONA

Search for optimal three-dimensional mapping of the solar corona from K-coronameter data [PB81-222903] N82-12017

SOLAR ENERGY
Solar coal-gasification reactor for hydrocarbon-free synthesis gas
[DE81-026600] N82-11247
Parametric sensitivity study for solar-assisted heat-pump systems
[DE81-030309] N82-11407
Irrigation market for solar thermal parabolic dish systems
[NASA-CR-164955] N82-11549
Use of solar thermal energy to generate electricity
[DE81-028797] N82-11606
An assessment of selected solar energy industry activities
[PB81-222424] N82-11623

SOLAR ENERGY CONVERSION
User needs for solar decision-making tools: The homebuilding industry
[DE81-027293] N82-11325
DOE solar-assisted heat-pump program: Its evolution and its potential
[DE81-026055] N82-11413
Carlisle house: An all-solar electric residence
[DOE/ET-20279/133] N82-11622

SOLAR GENERATORS
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566

SOLAR GRANULATION
Compressible convection in a rotating spherical shell --- latitudinal differential rotation on the Sun
[PB81-222895] N82-12018

SOLAR HEATING
Proposed simplified energy calculation procedure for use in energy conservation standards activities
[DE81-027190] N82-11319
Solar energy system performance evaluation: Forest City Dillon, Washington, D.C., January 1980 - December 1980
[DE81-028174] N82-11560
Solar energy system performance evaluation: Montecito Pines, Santa Rosa, California, November 1979 - April 1980
[DE81-028175] N82-11561
Study of photovoltaic cost elements. Volume 3: Sandia National Laboratories photovoltaic systems design catalog
[DE81-030986] N82-11567
Design, cost and performance comparisons of several solar thermal systems for process heat. Volume 1: Executive summary
[DE81-029881] N82-11576
Hodges residence: Performance of a direct gain passive solar home in Iowa
[DE81-025528] N82-11581
Solar heat pump simulator
[DE81-024368] N82-11583
Controls for solar heating and cooling
[DE81-025209] N82-11593
Correlation methods
[DE81-025379] N82-11598
Long-term performance of the Hunn passive solar residence
[DE81-028735] N82-11600
Attached sunspace design analysis
[DE81-028738] N82-11601
Heat storage duration
[DE81-026635] N82-11602
SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board
[DE81-903377] N82-11615
Carlisle house: An all-solar electric residence
[DOE/ET-20279/133] N82-11622
The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute
[PB81-226813] N82-11625

SOLAR HOUSES
MASEC SOLAR 80 home designs
[DE81-028344] N82-11316
Hodges residence: Performance of a direct gain passive solar home in Iowa
[DE81-025528] N82-11581
Long-term performance of the Hunn passive solar residence
[DE81-028735] N82-11600
Heat storage duration
[DE81-026635] N82-11602
Carlisle house: An all-solar electric residence
[DOE/ET-20279/133] N82-11622

SOLAR PHYSICS
A self-consistent linear-mode analysis of a stellar convection zone N82-12008
Compressible convection in a rotating spherical shell --- latitudinal differential rotation on the Sun
[PB81-222895] N82-12018

SOLAR PONDS (HEAT STORAGE)
Optical transparency of inexpensive salt solutions for construction of density-gradient ponds
[DE81-030832] N82-11559
Analysis of saturated solar pond characteristics, volume 1
[DE81-030820] N82-11618

SOLAR POSITION
Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres
[NASA-CR-164930] N82-12010

SOLAR RADIATION
Mississippi County Community College solar photovoltaic project
[DE81-030669] N82-11554
A model of temperature stratification for correction of leveling refraction
[PB81-225435] N82-11744
Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres
[NASA-CR-164930] N82-12010
Radiative transfer in cometary dust atmospheres: Critique of recent developments
[NASA-CR-164946] N82-12015
Radiation balances and the solar constant
[NASA-TM-76612] N82-12016

SOLAR REFLECTORS
Heliostat operation at the central receiver test facility (1978 - 1980)
[DE81-031926] N82-11556
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029824] N82-11565
Second generation heliostat program, September 1979-March 1981
[DE81-029752] N82-11570

SOLAR ROTATION
Compressible convection in a rotating spherical shell --- latitudinal differential rotation on the Sun
[PB81-222895] N82-12018

SOLAR TERRESTRIAL INTERACTIONS
Geomagnetic observations N82-11693

SOLAR THERMAL PROPULSION
Use of solar thermal energy to generate electricity
[DE81-028797] N82-11606

SOLENOIDS
Low temperature latching solenoid
[NASA-CASE-MSC-18106-1] N82-11357

SOLID CRYOGENS
Production and characterization of pure cryogenic inertial fusion targets
[DE81-025920] N82-11937

SOLID PROPELLANT COMBUSTION
An investigation of the combustion process in solid fuel ramjets
[AD-A104603] N82-11232

SOLID PROPELLANTS
An investigation of the combustion process in solid fuel ramjets
[AD-A104603] N82-11232

SOLID ROCKET PROPELLANTS
Analytical design for internal burning star grains of solid rockets N82-12025

SOLID SOLUTIONS
Growth of solid solution single crystals --- mercury cadmium tellurides
[NASA-CR-161891] N82-11958

SOLID SUSPENSIONS
Studies for the stabilization of coal-oil mixtures
[DOE/ET-10746/T1] N82-11156
Stabilization characteristics of deposits of biologic solids generated in aerated lagoons
[PB81-224297] N82-11668

SOLID WASTES
Advanced system experimental facility: Solid waste to methane gas. Background and process description
[DE81-030198] N82-11244
Preliminary development of a technique for estimating municipal-solid-waste generation
[DE81-024152] N82-11590
Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663

SOLIDIFICATION
Application of solidification theory to rapid solidification processing --- alloys and metallic glasses
[AD-A104561] N82-11214
Innovative technology for fabrication of ceramics: EDS rapid solidification process application to specialized materials
[PB81-214868] N82-11222
Comparison of costs for solidification of high-level radioactive waste solutions: Glass monoliths vs. metal matrices
[ANL-80-121] N82-11890

SOLIDS
Dynamic fracture in viscoelastic solids
[AD-A104687] N82-11494

SOLUBILITY
Adsorption of mixed liquids and solids from water solution onto activated carbon N82-11141
Coal hydrogenation via bonding of metallic compounds to coal, part 1. Solubilization of Illinois bituminous coal - the critical importance of methylene group cleavage, part 2
[DE81-027562] N82-11236

SOLUTES
Temperature and solute-transport simulation in streamflow using a Lagrangian reference frame
[PB81-225757] N82-11543
An electrostatic model for energies of molecules in solution N82-11869

SOLVENT EXTRACTION
Use of polyethers in the treatment of acidic high-activity nuclear wastes
[DE81-027087] N82-11895

SOLVENT REFINED COAL
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-029125] N82-11166
Solvent-Refined Coal-1 Demonstration Project. Final environmental impact statement, Volume 1 of 2 --- coal liquefaction plant at Newman, Kentucky
[DE81-025983] N82-11252
Solvent-Refined-Coal (SRC) process
[DE81-029628] N82-11268

SOLVENTS
Investigation of mechanisms of hydrogen transfer in coal hydrogenation
[DE81-030492] N82-11165
SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board
[DE81-903377] N82-11615

SONDES
Instrument intercomparisons at the Boulder Atmospheric Observatory during 1980
[PB81-220139] N82-11740

SOOT
Soot formation in synfuels
[DE81-030273] N82-11164
Effects of components of synfuels on soot formation
[DE81-027961] N82-11242

SORBENTS
The use of lanthanide chelates as selective complexing sorbents for gas chromatography N82-11139

SOUND INTENSITY
Handbook for industrial noise control
[NASA-SP-5108] N82-11858

SOUND PROPAGATION
An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857

SOUNDS (TOPOGRAPHIC FEATURES)
Index to observations of currents in Puget Sound, Washington, from 1908-1980
[PB81-224115] N82-11753

SOURCES
New Hampshire and Vermont point source inventory update for NECRMP
[PB81-219339] N82-11672

SOUTH AFRICA
Standard specification for air-brake reservoirs
[SABS-1312-1980] N82-11464

SOUTHERN CALIFORNIA
Local earthquake travel times and spatial variations of crustal velocity in southern California N82-11687

SOYUZ SPACECRAFT
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097
SPACE COMMUNICATION
The Telecommunications and Data Acquisition report
[NASA-CR-164939] N82-11279
The deep space optical channel. 2: Wave propagation effects N82-11288
RFI channels, 2 N82-11290
The R sub 0 parameter for the Gaussian channel N82-11291
Design of throat section of conical corrugated horns N82-11292
Cryogenic filters for RFI protection N82-11293
Traveling-wave maser, closed cycle refrigerator automation N82-11294
Digital SAR processing using a fast polynomial transform N82-11295
Minimizing the time to troubleshoot a failed system N82-11296
SPACE COOLING (BUILDINGS)
Assessment of building diagnostics
[DE81-027078] N82-11321
Alternative heat pump cycle studies
[DE81-024983] N82-11417
Brayton/Rankine 10-ton gas-fired space conditioning system, phase 2
[PB81-223372] N82-11478
SPACE ENVIRONMENT SIMULATION
Evaluation of the effects of solar radiation on glasses
[NASA-CR-161907] N82-11207
SPACE ERECTABLE STRUCTURES
Technology for large space systems: A special bibliography
[NASA-SP-7046(05)] N82-11093
Study of foldable elastic tubes for large space structure applications, phase 3
[NASA-CR-164929] N82-11493
SPACE EXPLORATION
A proposed new policy for planetary protection
[NASA-CR-164947] N82-11095
SPACE FLIGHT STRESS
USSR report. Life sciences biomedical and behavioral sciences, no. 12
[JPRS-79338] N82-11762
Otolithic reflex and space perception function of cosmonauts N82-11764
SPACE HEATING (BUILDINGS)
Energy analysis sample building data
[DE81-027188] N82-11318
Proposed simplified energy calculation procedure for use in energy conservation standards activities
[DE81-027190] N82-11319
Assessment of building diagnostics
[DE81-027078] N82-11321
Design, operation and performance of a ground coupled heat pump system in a cold climate
[DE81-024257] N82-11412
Investigation of direct expansion in ground source heat pumps
[DE81-024139] N82-11418
Well-water-source heat pump field performance study
[DE81-024136] N82-11419
Development and demonstration of an ammonia-water absorption heat pump
[DE81-024126] N82-11424
Brayton/Rankine 10-ton gas-fired space conditioning system, phase 2
[PB81-223372] N82-11478
SPACE LAW
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989
SPACE MAINTENANCE
Minimizing the time to troubleshoot a failed system N82-11296
SPACE PROCESSING
Space processing of electronic materials --- determining ther thermal conductivity of mercury cadmium tellurides and furnace design
[NASA-CR-161892] N82-11094
SPACE PROCESSING APPLICATIONS ROCKET
SPAR data set contents --- finite element structural analysis system
[NASA-TM-83181] N82-11816
SPACE SHUTTLE BOOSTERS
Space shuttle solid rocket booster sting interference wind tunnel test analysis
[NASA-CR-161885] N82-11040
SPACE SHUTTLE MAIN ENGINE
Space shuttle main engine controller
[NASA-TP-1932] N82-11784
SPACE SHUTTLE ORBITERS
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051
Dynamic Moire methods for detection of loosened space shuttle tiles
[NASA-TM-83205] N82-11434
SPACE SHUTTLES
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635
SPACE STORAGE
Analysis of space systems study for the space disposal of nuclear waste study report. Volume 2: Technical report
[NASA-CR-161888] N82-11889
SPACE WEAPONS
Where are we in the space war?
[NASA-TM-76604] N82-11096
SPACECRAFT
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051
SPACECRAFT CHARGING
Testing of a spacecraft model in a combined environment simulator
[NASA-TM-82723] N82-11106
Voltage gradients in solar array cavities as possible breakdown sites in spacecraft-charging-induced discharges
[NASA-TM-82710] N82-11107
The angular impact distribution of charged particles attracted to a charged cylindrical spacecraft
[AD-A104519] N82-11108
Particle trajectories in a model electric field 1 --- neutralizing spacecraft surfaces
[AD-A104507] N82-11870
SPACECRAFT COMMUNICATION
ATS-5 12 year in orbit evaluation
[NASA-CR-166728] N82-11101
Strategies for weather-dependent data acquisition N82-11286
Virtual center arraying N82-11287
Telecommunications in cometary environments
[NASA-CR-164956] N82-11340
Modulation/demodulation techniques for satellite communications. Part 4: Appendices
[NASA-CR-164954] N82-11341
SPACECRAFT CONSTRUCTION MATERIALS
Radiation testing of composite materials, in situ versus ex situ effects
[NASA-CR-3475] N82-11116
SPACECRAFT DESIGN
Control design of flexible spacecraft N82-11081
SPACECRAFT MODELS
Testing of a spacecraft model in a combined environment simulator
[NASA-TM-82723] N82-11106
SPACECRAFT PERFORMANCE
ATS-5 12 year in orbit evaluation
[NASA-CR-166728] N82-11101
SPACECRAFT POWER SUPPLIES
ATS-5 12 year in orbit evaluation
[NASA-CR-166728] N82-11101
Processing of silicon solar cells by ion implantation and laser annealing
[NASA-CR-165283] N82-11546
SPACECRAFT STRUCTURES
Technology for large space systems: A special bibliography
[NASA-SP-7046(05)] N82-11093
SPACECRAFT TELEVISION
ATS-5 12 year in orbit evaluation
[NASA-CR-166728] N82-11101
SPACECRAFT TRACKING
The Telecommunications and Data Acquisition report
[NASA-CR-164939] N82-11279
Networks consolidation program N82-11283
Pioneers 6 through 12 mission support N82-11285
SPANWISE BLOWING
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035
SPARK CHAMBERS
Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968
SPARK GAPS
Laser triggered spark gaps under experimental study N82-11451
Modular accelerator interconnecting and operating systems for PBFA-1
[DE81-025397] N82-11887
SPATIAL RESOLUTION
An evaluation of the spatial resolution of soil moisture information
[NASA-CR-166724] N82-11513
SPECIFIC HEAT
The volumes and heat capacities of nonelectrolytes and organic electrolytes in methanol at 25 C N82-11142
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170
SPECIFICATIONS
Standard specification for light ladders
[SABS-1304-1980] N82-11277
OBJ-1: A study in executable algebraic formal specification
[AD-A104468] N82-11803
The effects of the symbology and spatial arrangement of software specifications in a debugging task
[AD-A104541] N82-11806
SPECTRAL BANDS
Development of MBE grown Pb-salt semiconductor lasers for the 8.0 to 15.0 micrometer spectral region
[NASA-CR-165683] N82-11453
SPECTRAL EMISSION
Far-infrared measurements of trace gases
[NASA-CR-164965] N82-11698
SPECTRAL REFLECTANCE
Identification of lithologic units using multichannel imaging systems N82-11509
SPECTRAL RESOLUTION
Stimulated Raman studies of CO2-laser-excited SF6
[DE81-025829] N82-11463
SPECTRAL SIGNATURES
Inclusion of a simple vegetation layer in terrain temperature models for thermal infrared (IR) signature prediction
[AD-A104469] N82-11910
SPECTROSCOPIC ANALYSIS
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-025961] N82-11167
SPECTROSCOPY
Scientific innovation and resonance ionization spectroscopy
[DE81-023193] N82-11157
Optoacoustic spectroscopy to detect hydrazine fuels
[AD-A104675] N82-11229
SPECTRUM ANALYSIS
Fourier analysis of broadband, low-level signals using switched inputs
[AD-A104588] N82-11353
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925
Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968
SPEECH BASEBAND COMPRESSION
Research on narrowband communications
[AD-A104296] N82-11345
SPENT FUELS
International safeguards for spent fuel storage
[DE81-029896] N82-11892

SPHERICAL COORDINATES
On transonic flow in hyperbolic Laval nozzles --- the conformal curvilinear coordinate method N82-11020
SPHERICAL SHELLS
On the shape and orientation control of an orbiting shallow spherical shell structure --- shape and orientation control of large dish type receivers/reflectors [NASA-CR-164970] N82-11100
Compressible convection in a rotating spherical shell --- latitudinal differential rotation on the Sun [PB81-222895] N82-12018
SPHYGMOGRAPHY
Logic-controlled occlusive cuff system [NASA-CASE-MSC-14836-1] N82-11770
SPIN-SPIN COUPLING
H-O precessor computer code [DE81-026669] N82-11814
SPREAD F
ALTAIR radar study of equatorial spread F [AD-A104554] N82-11710
SPUTTERING
Cadmium sulfide/copper sulfide heterojunction cell research by sputter deposition [DE81-026219] N82-11553
SQUALLS
Doppler radar data analysis during fiscal year 1980 [PB81-225476] N82-11742
STABILITY
Stability of permanent-magnet parameters [DE81-027013] N82-11852
STABILIZERS (FLUID DYNAMICS)
Research on the recirculating flow rate in the wake of two-dimensional flame stabilizers (under cold conditions) N82-11028
STACKS
Sulfur pollution control. Phase 2: The impact of stack gas cleanup on the sulfur mining industry of Texas and Louisiana [PB81-222820] N82-11653
FGDIS primer: Major equipment/component classifications, problem/solution access codes, and definitions related to FGD systems as contained in the Flue Gas Desulfurization Information System (FGDIS) [PB81-225948] N82-11985
STAINLESS STEELS
Activation of superalloys and stainless steels for chromium plating [AD-A104313] N82-11188
Hydrogen damage in stainless steel [DP-MS-81-31] N82-11197
Trapping and surface permeation of deuterium in Fe, Ni and stainless steel: An ion-beam study [DE81-023303] N82-11201
STANDARDIZATION
Low-cost solar array project: Four absolute cavity radiometer (pyrheliometer) intercomparisons at New River, Arizona: Radiometer standards [NASA-CR-164950] N82-11435
STANDARDS
Rotorcraft icing: Status and prospects [AGARD-AR-166] N82-11056
Proposed standard requirements and procedures for icing clearance N82-11061
Proposed simplified energy calculation procedure for use in energy conservation standards activities [DE81-027190] N82-11319
Portable transfer standards for pressure and gas flow measurements [DE81-024445] N82-11409
Calibration of a laminar flowmeter [DE81-024423] N82-11442
Intergrated assessment for energy-related environmental standards: A summary of issues and findings [DE81-028552] N82-11646
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 7: Periodic review and technological escalation of performance standards: New source performance standards review process [PB81-218117] N82-11665
Technical activities of the Office of Environmental Measurements - 1980 [PB81-227860] N82-11677
STANDING WAVES
System for controlled acoustic rotataion of objects [NASA-CASE-NPO-15522-1] N82-11861
STARTERS
Motor power factor controller with a reduced voltage starter [NASA-CASE-MFS-25586-1] N82-11360
STATISTICAL ANALYSIS
The quantitative determination of non-metallic inclusions by a mathematical statistical method [RAE-LIB-TRANS-2066] N82-11179
Sampling design for the 1980 commercial and multifamily residential building survey [DE81-028783] N82-11320
Theoretical investigation of a passive scalar such as temperature in isotropic turbulence N82-11386
Recent advances in statistical methods for system reliability using Bernoulli sampling of components [AD-A104436] N82-11482
Feasible objective confidence bounds for system reliability [AD-A104260] N82-11483
Estimating the statistical properties of crack growth for small cracks [AD-A104672] N82-11496
Local earthquake travel times and spatial variations of crustal velocity in southern California N82-11687
Applications of non-parametric statistics and analysis of variance on sample variances [NASA-CR-165789] N82-11834
STATISTICAL DECISION THEORY
A simulation analysis of the effectiveness of Markovian control and Bayesian control --- cost analysis [AD-A104635] N82-11840
STATISTICAL DISTRIBUTIONS
Applications of non-parametric statistics and analysis of variance on sample variances [NASA-CR-165789] N82-11834
Generalized L-, M- and R-statistics [AD-A104480] N82-11835
STATISTICAL MECHANICS
Maximal entropy in fluid and plasma turbulence: A review [DE81-025388] N82-11946
STATISTICAL TESTS
Validation of a Monte Carlo simulation of binary time series [AD-A104525] N82-11838
STATISTICAL WEATHER FORECASTING
Estimates for the probabilities of surface-to-air cloud-free lines-of-sight and low cloud statistics from ship observations. Part 1: Fifteen marine locations [AD-A104633] N82-11730
STDN (NETWORK)
A dedicated 26-m SETI sky survey instrument facility: A feasibility study N82-11281
Networks consolidation program N82-11283
STEADY FLOW
Mean values and an inverse problem for porous media flow [DE81-027210] N82-11411
STEAM TURBINES
Preliminary evaluation of advanced coal-based electricity-generating technologies by means of system-integration analysis [DE81-029989] N82-11573
STEELS
Failure analysis of a tool steel torque shaft [NASA-TM-82758] N82-11184
Microstructure and properties of dual-phase steels containing fine precipitates [DE81-029946] N82-11192
Adsorption of hydrogen on iron and the hydrogen embrittlement of steel [DE81-025164] N82-11196
STEFAN-BOLTZMANN LAW
Stefan problem with a convective boundary condition [DE81-030424] N82-11410
STELLAR ATMOSPHERES
Nonradial pulsations of upsilon Orionis and supergiants [DE81-025338] N82-12005
STELLAR LUMINOSITY
Photoelectric surface brightness observations and the geometry of reflection nebulae N82-12002
STELLAR MASS ACCRETION
Theoretical and observational aspects of stellar variability N82-12007
STELLAR MASS EJECTION
Nonradial pulsations of upsilon Orionis and supergiants [DE81-025338] N82-12005
Theoretical and observational aspects of stellar variability N82-12007
STELLAR MODELS
Nonradial pulsations of upsilon Orionis and supergiants [DE81-025338] N82-12005
A self-consistent linear-mode analysis of a stellar convection zone N82-12008
STELLAR OSCILLATIONS
Nonradial pulsations of upsilon Orionis and supergiants [DE81-025338] N82-12005
STELLAR RADIATION
Optical and ultraviolet studies of stellar chromospheres of lambda Andromedae and other late-type stars N82-12003
Linear and nonlinear theory study of Alpha Virginis [DE81-025335] N82-12006
STELLAR SPECTRA
M-alpha emission from a disk in the close binary U Cephei: A Monte Carlo simulation N82-12001
Optical and ultraviolet studies of stellar chromospheres of lambda Andromedae and other late-type stars N82-12003
STELLAR TEMPERATURE
Theoretical studies of chromospheres and winds in cool stars [NASA-CR-164969] N82-12004
STELLAR WINDS
Theoretical studies of chromospheres and winds in cool stars [NASA-CR-164969] N82-12004
STEREOCHEMISTRY
Role of excited states of molecular ions in structure studies with high-energy collisions [DE81-023898] N82-11661
STIFFNESS MATRIX
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing [NASA-CR-165772] N82-11070
STIRLING CYCLE
Stirling cycle cryogenic cooler --- magnetically suspended pistons [NASA-CASE-GSC-12697-1] N82-11312
Diaphragm Stirling engine heat-actuated heat pump development [DE81-024076] N82-11423
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals [NASA-CR-165479] N82-11466
Jet impingement heat transfer enhancement for the GPU-3 Stirling engine [NASA-TM-82727] N82-11993
STOCHASTIC PROCESSES
Theory of stochastic optimal control some basic notions N82-11075
An introduction to stochasic optimal control theory N82-11076
Stochastic models for dependent load processes [PB81-219735] N82-11327
On permanents and diagonal products of doubly stochastic matrices N82-11832
STORAGE BATTERIES
Calcium/metal sulfide battery development program [ANL-81-14] N82-11578
STORAGE RINGS (PARTICLE ACCELERATORS)
Modular accelerator interconnecting and operating systems for PBFA-1 [DE81-025397] N82-11887
Storage ring injection [DE81-023846] N82-11901
STORAGE STABILITY
Technical and economic aspects of hydrogen storage in metal hydrides [NASA-TM-76610] N82-11223
The storage of hydrogen in the form of metal hydrides: An application to thermal engines [NASA-TM-76609] N82-11225
Method for retarding dye fading during archival storage of developed color photographic film --- inert atmosphere [NASA-CASE-MFS-23250-1] N82-11432

STORAGE TANKS
Controls for solar heating and cooling
[DE81-025209] N82-11593
STORMS
An evaluation of the spatial resolution of soil moisture information
[NASA-CR-166724] N82-11513
STORMS (METEOROLOGY)
A numerical dynamical investigation of the role of subsynoptic inertial an isallobaric adjustments in organizing severe local storm ensembles N82-11719
Relationships between synoptic storm activity and sea surface temperature anomalies over the North Pacific Ocean
[AD-A104590] N82-11727
Doppler radar data analysis during fiscal year 1980
[PB81-225476] N82-11742
Precipitation characteristics of summer storms at Straight Canyon barometer, Watershed, Utah
[PB81-223950] N82-11750
STRAIN GAGES
Transient temperature response of strain gages
[DE81-031922] N82-11440
STRAIN RATE
DC calibration of the strain sensitivity of a single mode optical fiber interferometer N82-11124
STRAPS
Standard specification for industrial safety-belt assemblies
[SABS-809-1980] N82-11278
STRATIFICATION
A model of temperature stratification for correction of leveling refraction
[PB81-225435] N82-11744
STRATIGRAPHY
Geologic considerations in underground coal mining system design
[NASA-CR-164961] N82-11516
Beach foreshore sedimentation by organic and inorganic processes N82-11630
STRATOSPHERE
Report of Lawrence Livermore National Laboratory to the Federal Aviation Agency on the high-altitude pollution program, 1980
[DE81-028264] N82-11647
Stratospheric trace gas composition studies utilizing in situ cryogenic, whole-air sampling methods
[AD-A104375] N82-11689
Meridional heat transport at the onset of winter stratospheric warming
[NASA-TM-76614] N82-11697
The 4-day temperature wave in the winter polar stratosphere N82-11720
STREAMS
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 1
[PB81-225286] N82-11675
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 2
[PB81-225294] N82-11676
STRESS ANALYSIS
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
STRESS CORROSION
Hydrogen damage in stainless steel
[DP-MS-81-31] N82-11197
Fracture mechanics of cellular glass
[NASA-CR-164959] N82-11209
STRESS CORROSION CRACKING
Flaw growth of 7075, 7475, 7050 and 7049 aluminum alloy plate in stress corrosion environments: 4-year marine atmosphere results
[NASA-CR-161887] N82-11181
Electrochemical conditions within stress corrosion cracks (experimental techniques)
[AD-A104246] N82-11497
STRESS CYCLES
Fatigue initiation at a high or low number of cycles
[RAE-LIB-TRANS-2056] N82-11487
STRESS FUNCTIONS
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508
STRESS INTENSITY FACTORS
Strength behaviour of fatigue cracked lugs --- stress intensity and crack propagation characteristics
[RAE-LIB-TRANS-2057] N82-11486
STRESS MEASUREMENT
Finite element analysis of the split Hopkinson bar
[DE81-030387] N82-11503
Dynamic measurement of Poisson's ratio in granular materials at 0.2 to 0.8 GPa
[DE81-027559] N82-11504
STRESS PROPAGATION
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508
STRESS RELAXATION
Stress relaxation of cellular silicone material: 1981
[DE81-030692] N82-11137
Contribution to the characterization of the anelastic properties of multi-phase systems
[DE81-025581] N82-11198
Relaxation of geothermal-reservoir stresses induced by heat production
[DE81-032024] N82-11715
STRETCHING
The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics
[RAE-LIB-TRANS-2052] N82-11205
STRIP TRANSMISSION LINES
Study of microstrip antenna elements, arrays, feeds, losses, and applications
[AD-A104493] N82-11343
STRUCTURAL ANALYSIS
Parameter estimation of large flexible aerospace structures with application to the control of the Maypole Deployable Reflector
[NASA-CR-164971] N82-11099
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program
[AD-A104546] N82-11499
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program
[AD-A104547] N82-11500
SPAR data set contents --- finite element structural analysis system
[NASA-TM-83181] N82-11816
Finite element analysis of coupled magneto-mechanical problems of conducting plates
[AD-A104406] N82-11851
STRUCTURAL BASINS
Petroleum geology and resource assessment of the middle Caspian Basin, USSR, with special emphasis on the Uzen field
[DE81-029951] N82-11518
Planning a comprehensive program for exploration of the anthracite deposits of the Narragansett Basin of Massachusetts and Rhode Island, phase 1 and 2
[DE81-028490] N82-11519
Identification of geopressured occurrences outside of the Gulf Coast
[DE81-025511] N82-11522
Water resources of upper separation creek basin, south-central Wyoming
[PB81-224263] N82-11531
STRUCTURAL DESIGN
Control design of flexible spacecraft N82-11081
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Jointless bridges
[PB81-227738] N82-11332
Magnetohydrodynamic research program of the MHD Energy center at Mississippi State University and structural features of MHD radiant boilers
[DE81-029901] N82-11934
STRUCTURAL DESIGN CRITERIA
Considerations for the design, implementation, and effective operation of Sandia's super-power generators
[DE81-025404] N82-11908
STRUCTURAL ENGINEERING
MASEC SOLAR 80 home designs
[DE81-028344] N82-11316
Jointless bridges
[PB81-227738] N82-11332
Research in nonlinear structural and solid mechanics
[NASA-CP-2147-SUPPL] N82-11489
STRUCTURAL INFLUENCE COEFFICIENTS
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070
STRUCTURAL RELIABILITY
Standard specification for light ladders
[SABS-1304-1980] N82-11277
STRUCTURAL STABILITY
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070
STRUCTURAL VIBRATION
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
On-line failure detection of vibrating structures
[UCRL-86099] N82-11505
Finite element analysis of coupled magneto-mechanical problems of conducting plates
[AD-A104406] N82-11851
STRUCTURAL WEIGHT
Firefighting module development
[NASA-TM-82444] N82-11311
SUBREFLECTORS
Surface resistivity measurements of candidate subreflector surfaces N82-11300
SUBROUTINES
Tennessee Valley Authority atmospheric fluidized-bed combustor simulation
[DE81-030262] N82-11151
Automatic multi-banking of memory for microprocessors
[NASA-CASE-NPO-15295-1] N82-11785
SUBSIDENCE
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE81-027131] N82-11712
SUBSONIC FLOW
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade N82-11024
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
Acta Mechania Sinica
[AD-A105635] N82-12021
On the kernel function collocation method in steady subsonic flow for wing with control surfaces N82-12023
SUBSONIC WIND TUNNELS
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069
SUBSTRATES
Probabilistic modeling of subgrade soil strengths
[AD-A104336] N82-11315
SUCTION
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391
On the active part played by the heart in the venous return of the blood
[RAE-LIB-TRANS-2017] N82-11766
SULFITES
Sulfur pollution control. Phase 1: The disposal program (sections 5 through 7)
[PB81-222804] N82-11655
SULFUR
Vibrational spectra and atom-atom potentials in the crystalline state. 1: A comparison of hexasulfur, octasulfur and dodecasulfur. 2: A study of solid allene N82-11957
SULFUR COMPOUNDS
Modified-sulfur cements for use in concretes, flexible pavings, coatings, and grouts
[PB81-226870] N82-11333
SULFUR DIOXIDES
Studies of the kinetics and mechanism of gas-surface reactions on metal and metal oxide surfaces N82-11140

Calculations from compliance emissions of long and short term SO2 concentrations in the southwest Pennsylvania air quality control region
[PB81-226078] N82-11678

SULFUR FLUORIDES
Vibrational sensitization of of 14N14NO, 15N14NO and H2O by laser excited SF6 N82-11143

SULFUR OXIDES
Effects of acid precipitation on cation transport in New Hampshire forest soils
[DE81-027494] N82-11648
Control techniques for sulfur oxide emissions from stationary sources, second edition
[PB81-220048] N82-11662

SULFURIC ACID
A compilation of thermodynamic and transport properties of aqueous sulfuric acid
[PB81-229171] N82-11172
Sulfur pollution control. Phase 1: The disposal program
[PB81-222612] N82-11652

SUMS
A general moment inequality for the maximum of rectangular partial sums of multiple series
[AD-A104475] N82-11828

SUPERCONDUCTIVITY
Large gain, negative resistance, and oscillations in superconducting quasiparticle heterodyne mixers
[AD-A104534] N82-11361

SUPERCONDUCTORS
Test results of ac superconducting cables
[BNL-29291] N82-11371
Superconducting proximity effect for in situ and model layered systems
[DE81-025530] N82-11372

SUPERCRITICAL WINGS
The comparison between the unsteady pressure fields calculated and measured on the ZKP model
[RAE-LIB-TRANS-2061] N82-11029
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054

SUPERGIANT STARS
Nonradial pulsations of upsilon Orionis and supergiants
[DE81-025338] N82-12005

SUPERSATURATION
Deposition and corrosion phenomena on aluminum surfaces under deluged dry cooling-tower conditions
[DE81-025483] N82-11193

SUPERSONIC FLOW
Journal of Engineering Thermophysics (selected articles)
[AD-A105604] N82-11023
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen
N82-11026
Molecular spectroscopy and relaxation in supersonic beams N82-11867

SUPERSONIC INLETS
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor N82-11025

SUPERSONIC SPEEDS
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016

SUPPLYING
Electric power supply and demand for the contiguous United States, 1981 - 1990
[DE81-027126] N82-11376

SUPPORT INTERFERENCE
Space shuttle solid rocket booster sting interference wind tunnel test analysis
[NASA-CR-161885] N82-11040

SURFACE ACOUSTIC WAVE DEVICES
Optical fiber interferometer for the study of ultrasonic waves in composite materials, discussion
N82-11122
Characterization of metal-polymer boundaries using Stoneley and Leaky waves N82-11128
Optical detection of pulsed surface particle displacements N82-11131
Dual differential interferometer for measurements of broadband surface acoustic waves N82-11133
A comparison of weighting techniques for SAW transducers at UHF
[AD-A104510] N82-11362
Low temperature quartz crystal oscillator fast warm-up saw oscillator
[AD-A104403] N82-11366
Evaluation of alpha aluminum phosphate for advanced acoustic wave devices
[AD-A104685] N82-11962

SURFACE DISTORTION
Polishing-to-figuring transition in turned optics
[DE81-028691] N82-11917

SURFACE ENERGY
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE81-025587] N82-11577

SURFACE FINISHING
The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics
[RAE-LIB-TRANS-2052] N82-11205
Tooling for electrochemical deburring
[DE81-030190] N82-11475

SURFACE LAYERS
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967

SURFACE PROPERTIES
Surface analysis by Fourier transform infrared (Ftir) spectroscopy
[DE81-025741] N82-11150
Surface resistivity measurements of candidate subreflector surfaces N82-11300
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967
A theoretical and experimental investigation of the photometric functions of particulate surfaces
N82-12012

SURFACE REACTIONS
Studies of the kinetics and mechanism of gas-surface reactions on metal and metal oxide surfaces N82-11140
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183
Epitaxial morphologies and deposition energetics of polyoxymethylene N82-11204
Laser excitation of surface electronic states for a one-dimensional semiconductor
[AD-A104522] N82-11964

SURFACE ROUGHNESS
Quiet bearing surface characterization
[AD-A104412] N82-11472

SURFACE TEMPERATURE
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen
N82-11026
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals
[NASA-CR-165479] N82-11466
Relationships between synoptic storm activity and sea surface temperature anomalies over the North Pacific Ocean
[AD-A104590] N82-11727
Inclusion of a simple vegetation layer in terrain temperature models for thermal infrared (IR) signature prediction
[AD-A104469] N82-11910

SURFACE WATER
Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269
Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270
Water resources data for Kentucky, water year 1980
[PB81-223612] N82-11526
Water resources data for Michigan, water year 1980
[PB81-224180] N82-11527
Water resources data for Ohio, water year 1980. Volume 2: St. Lawrence River basin
[PB81-217077] N82-11528

SURFACE WAVES
Critical wave conditions for sand motion initiation
[AD-A104376] N82-11400

SURFACES
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035

SUSQUEHANNA RIVER BASIN (MD-NY-PA)
Flow routing in the Susquehanna River Basin: Part 4 - routing reservoir releases in the eastern Susquehanna River Basin in New York State
[PB81-221533] N82-11533

SWEEP ANGLE
The comparison between the unsteady pressure fields calculated and measured on the ZKP model
[RAE-LIB-TRANS-2061] N82-11029

SWELLING
Irradiation-induced swelling in commercial alloys
[DE81-029755] N82-11191

SWEPT WINGS
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

SYMMETRY
Symmetries of the nonlinear conductivity for a relativistic turbulent plasma
[AD-A104544] N82-11931
Classical field theory with Z(3) symmetry
[DE81-027089] N82-11969

SYNCHRONOUS MOTORS
Application of a rare-earth cobalt magnet to synchronous motors
[NAL-TR-656] N82-11358

SYNCHRONOUS SATELLITES
Mission operation report: RCA-D/Delta launch
[NASA-TM-84063] N82-11102
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738

SYNCHROTRON RADIATION
Workshop on Atomic Physics at the National Synchrotron Light Source
[DE81-023507] N82-11874

SYNOPTIC METEOROLOGY
Tropical storm movement based on synoptic map typing using empirical orthogonal functions
[AD-A104591] N82-11728

SYNTHESIS (CHEMISTRY)
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE81-028209] N82-11168
Lasers in materials processing
[DE81-027657] N82-11460

SYNTHETIC APERTURE RADAR
Digital SAR processing using a fast polynomial transform N82-11295
SAR processing on the MPP
[NASA-CR-166726] N82-11801

SYNTHETIC FUELS
Soot formation in synfuels
[DE81-030273] N82-11164
Outgassing of two synthetic fuels
[AD-A104580] N82-11231
Alternative fuel for the steel industry of Northern Indiana: A prefeasibility study of a central coal gasification project
[DE81-029314] N82-11233
Effects of components of synfuels on soot formation
[DE81-027961] N82-11242
Advanced-gasification processes
[DE81-030184] N82-11254
Fusion as a source of synthetic fuels
[BNL-29281] N82-11257
Transportation fuels from synthetic gas
[DE81-029614] N82-11258
Synthetic fuel development for the Upper Missouri River Basin. Section 13: Water assessment report
[PB81-224537] N82-11276

SYSTEM EFFECTIVENESS
Design, operation and performance of a ground coupled heat pump system in a cold climate
[DE81-024257] N82-11412

SYSTEMS
Atmospheric fluidized-bed projects technology overview
[DE81-027143] N82-11251
SYSTEMS ANALYSIS
Cycle and performance analysis of absorption heat pumps for waste heat utilization
[DE81-030705] N82-11405
Measuring/computing complex for automation of ergonomic experiments N82-11765
SYSTEMS ENGINEERING
Design considerations for optimal flight control systems N82-11077
Design techniques for mutlivariable flight control systems N82-11078
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083
Conceptual design for a multi-user medium BTU coal gasification complex. Volume 1: Executive summary
[DE81-027139] N82-11238
Minimizing the time to troubleshoot a failed system N82-11296
DOE solar-assisted heat-pump program: Its evolution and its potential
[DE81-026055] N82-11413
Conduct a state-of-the-art survey of existing knowledge for the design of ground-source heat pumps
[DE81-024084] N82-11420
Performance predictions and measurements for space-power-system heat pipes
[LA-UR-81-909] N82-11426
Geologic considerations in underground coal mining system design
[NASA-CR-164961] N82-11516
Environmental protection as an ongoing component of large facilities engineering projects N82-11633
Space shuttle main engine controller
[NASA-TP-1932] N82-11784
Comparisons of some large scientific computers
[NASA-TM-81928] N82-11817
Modular accelerator interconnecting and operating systems for PBFA-1
[DE81-025397] N82-11887
Improvements to a high-frequency fiber-optic system for plasma diagnostics
[DE81-028741] N82-11919
Plasma assessments for the Fusion Engineering Device (FED)
[DE81-024254] N82-11948
SYSTEMS SIMULATION
Solvent-Refined-Coal (SRC) process
[DE81-029628] N82-11268
Energy analysis sample building data
[DE81-027188] N82-11318
Solar heat pump simulator
[DE81-024368] N82-11583
H-O precessor computer code
[DE81-026669] N82-11814
SYSTOLE
On the active part played by the heart in the venous return of the blood
[RAE-LIB-TRANS-2017] N82-11766

T

T-38 AIRCRAFT
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860
TABLES (DATA)
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170
Calibration of a laminar flowmeter: The data and correlations
[DE81-025227] N82-11441
TANKS (CONTAINERS)
Lightweight concrete materials and structural systems for water tanks for thermal storage
[COO-4703-26] N82-11501
TANTALUM
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900
TARGET RECOGNITION
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 1: Investigation of resonance extraction procedures --- for target recognition
[AD-A104530] N82-11350
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 2: Appendices --- for target recognition
[AD-A104531] N82-11351
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 3: Translation of Prony's method --- for target recognition
[AD-A104532] N82-11352
TECHNICAL WRITING
Writing effective reports
[PB81-214645] N82-11983
TECHNOLOGICAL FORECASTING
Packet Speech Systems Technology
[AD-A104373] N82-11348
Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 7: Periodic review and technological escalation of performance standards: New source performance standards review process
[PB81-218117] N82-11665
Forecast of emerging technologies
[PB81-227290] N82-11998
TECHNOLOGIES
Surface coal gasification
[DE81-030183] N82-11253
Forecast of emerging technologies
[PB81-227290] N82-11998
TECHNOLOGY ASSESSMENT
Assessment of advanced coal gasification processes
[NASA-CR-164949] N82-11146
Jet fuel locks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities
[DE81-025518] N82-11240
Assessment of oil-shale technology in Brazil
[DE81-027574] N82-11249
Atmospheric fluidized-bed projects technology overview
[DE81-027143] N82-11251
Advanced-gasification processes
[DE81-030184] N82-11254
Alcohol fuels in the United States
[DE81-026013] N82-11265
Gas recovery from coal deposits
[PB81-222291] N82-11271
Mechanical Energy Storage Technology (MEST) development
[DE81-026800] N82-11596
An assessment of selected solar energy industry activities
[PB81-222424] N82-11623
Philosophy of supercomputing
[DE81-028586] N82-11796
Acoustic scaling: A review of progress to date, and of possible future development
[BBC-RD-1981/6] N82-11855
Nova pulse power system description and status
[DE81-025600] N82-11898
TECHNOLOGY TRANSFER
Scientific innovation and resonance ionization spectroscopy
[DE81-023193] N82-11157
Technology transfer of NASA microwave remote sensing system
[NASA-CR-165791] N82-11515
Overview of the applied battery and electrochemical research program
[DE81-027397] N82-11594
TECHNOLOGY UTILIZATION
Handbook for industrial noise control
[NASA-SP-5108] N82-11858
TECTONICS
The quantitative recognition and evaluation of seismic quiescence: Applications to earthquake prediction and subduction zone tectonics N82-11682
Studies of continental and oceanic crust from seismic, geodetic and magnetic observations N82-11685
TEFLON (TRADEMARK)
Effects of ionizing radiation on the chemical structure, crystalline content and molecular weight distribution of various Teflon resins N82-11203
TELECOMMUNICATION
RFI channels, 2 N82-11290
The R sub 0 parameter for the Gaussian channel N82-11291
Design of throat section of conical corrugated horns N82-11292
Cryogenic filters for RFI protection N82-11293
Traveling-wave maser, closed cycle refrigerator automation N82-11294
Telecommunications in cometary environments
[NASA-CR-164956] N82-11340
TELEMETRY
Outsider's look at flight instrumentation
[DE81-025409] N82-11066
Magnetic Field Satellite (Magsat) data processing system specifications
[NASA-CR-166737] N82-11103
Symbol error rate performance evaluation of the LM37 multimegabit telemetry modulator-demodulator unit N82-11289
TELEVISION TRANSMISSION
The use of remote active deflectors for feeding UHF relay stations
[BBC-RD-1981/5] N82-11334
TEMPERATURE
Theoretical investigation of a passive scalar such as temperature in isotropic turbulence N82-11386
Finite temperature relativistic magnetohydrodynamic winds N82-11923
TEMPERATURE DEPENDENCE
Transient temperature response of strain gages
[DE81-031922] N82-11440
Heating of a dense plasma with an intense relativistic electron beam: Initial observations
[DE81-025348] N82-11945
TEMPERATURE DISTRIBUTION
The 4-day temperature wave in the winter polar stratosphere N82-11720
TEMPERATURE EFFECTS
Hydride chemical compressor, phase 1
[DE81-030199] N82-11155
Thermal and chemical effects in high pressure rolling/sliding contacts
[AD-A104473] N82-11471
Dislocation induced noises in semiconductors at low and high temperatures
[AD-A104449] N82-11960
TEMPERATURE GRADIENTS
A model of temperature stratification for correction of leveling refraction
[PB81-225435] N82-11744
TEMPERATURE MEASUREMENT
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089
Thermal expansion of metal matrix composites --- acousto-optic study of microcracks and temperature measurement
[AD-A104680] N82-11134
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals
[NASA-CR-165479] N82-11466
Temperature measurement in turbulent arcs N82-11921
TEMPORAL RESOLUTION
Stimulated Raman studies of CO2-laser-excited SF6
[DE81-025829] N82-11463
TENNESSEE
Water resources data for Tennessee, water year 1979
[PB81-228249] N82-11539
TENSILE PROPERTIES
Radiation testing of composite materials, in situ versus ex situ effects
[NASA-CR-3475] N82-11116
TENSILE TESTS
Radiation testing of composite materials, in situ versus ex situ effects
[NASA-CR-3475] N82-11116
TENSORS
Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394

TERMINOLOGY
Content representation for retrieval
[PB81-170672] N82-11984

TERNARY ALLOYS
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76620] N82-11180

TERRAIN
The morphology and evolution of Ganymede and Callisto N82-12013

TERRAIN FOLLOWING AIRCRAFT
Conceptual design of a computer-generated topographic display system to aid mission planning and mission conduct by Army aviators
[AD-A104388] N82-11517

TERRESTRIAL PLANETS
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691

TERRESTRIAL RADIATION
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165781] N82-11723
Thermal algorithms analysis --- programming tasks supporting the development of a thermal model of the Earth's surface
[NASA-CR-166716] N82-11800
Radiation balances and the solar constant
[NASA-TM-76612] N82-12016

TEST FACILITIES
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Facilities for development and clearance N82-11059
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089
System safety program plan --- electromagnetic pulse testing of the A-7E aircraft
[AD-A104557] N82-11354
Lewis Research Center's coal-fired, pressurized, fluidized-bed reactor test facility
[NASA-TM-81616] N82-11397
USSR report. Life sciences biomedical and behavioral sciences, no. 12
[JPRS-79338] N82-11762
Measuring/computing complex for automation of ergonomic experiments N82-11765
Magnetohydrodynamic research program of the MHD Energy center at Mississippi State University and structural features of MHD radiant boilers
[DE81-029901] N82-11934

TEST FIRING
AC firing ability of detonation
[PB81-216053] N82-11272

TEXAS
Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas --- Texas and Northern Chihuahua, Mexico
[NASA-CR-164964] N82-11695

THEORETICAL PHYSICS
Theoretical and experimental studies of the electro-optic effect: Toward a microscopic understanding
[AD-A104363] N82-11961

THERMAL BATTERIES
Review of thermally regenerative electrochemical systems, volume 2
[DE81-029624] N82-11572

THERMAL CONDUCTIVITY
Space processing of electronic materials --- determining ther mal conductivity of mercury cadmium tellurides and furnace design
[NASA-CR-161892] N82-11094
Certain physical properties of cobalt and nickel borides
[NASA-TM-76623] N82-11185
Advanced selenide thermoelectric development program
[DE81-027823] N82-11562
Ion thermal conductivity for a pure Tokamak plasma
[DE81-029710] N82-11932

THERMAL EMISSION
Decay heat curve evaluation test
[DE81-027181] N82-11976

THERMAL ENERGY
Site And Neighborhood Design (SAND): Development of simplified automated building thermal load procedures, phase 1
[DE81-027138] N82-11317
Review of thermally regenerative electrochemical systems, volume 2
[DE81-029624] N82-11572
Analysis of thermal/mechanical energy-conversion concepts
[DE81-027854] N82-11585
Use of solar thermal energy to generate electricity
[DE81-028797] N82-11606

THERMAL EXPANSION
Thermal expansion of metal matrix composites --- acousto-optic study of microcracks and temperature measurement
[AD-A104680] N82-11134

THERMAL INSULATION
Assessment of roofing research
[DE81-027077] N82-11322
Three prototype designs for an exterior-mounted, interior-operated, movable insulation system
[DE81-025586] N82-11324
Lightweight concrete materials and structural systems for water tanks for thermal storage
[COO-4703-26] N82-11501

THERMAL POLLUTION
Meteorological Effects of Thermal Energy Releases (METER) program
[DE81-030431] N82-11640
OTEC environmental biological oceanographic program
[DE81-027402] N82-11645

THERMAL PROTECTION
Thermal control coatings based on trialkoxysilane hydrolysate binders --- tolerance to ultraviolet radiation in vacuum
[NASA-CASE-MFS-25620-1] N82-11118

THERMAL STABILITY
Aluminum ion-containing polyimide adhesives
[NASA-CASE-LAR-12640-1] N82-11206

THERMAL STRESSES
Relaxation of geothermal-reservoir stresses induced by heat production
[DE81-032024] N82-11715

THERMALIZATION (ENERGY ABSORPTION)
Cycle and performance analysis of absorption heat pumps for waste heat utilization
[DE81-030705] N82-11405
Chemical heat pump program: An overview
[DE81-025086] N82-11414

THERMIONIC CONVERTERS
High thermal power density heat transfer --- thermionic converters
[NASA-CASE-LEW-12950-1] N82-11399

THERMISTORS
Directional flow sensor
[NASA-CASE-FRC-11074-1] N82-11436

THERMOCHEMICAL PROPERTIES
Thermal and electrochemical biomass conversion at SERI
[DE81-030507] N82-11563

THERMOCHEMISTRY
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170
Mass spectrometric studies of MHD slag thermochemistry
[PB81-221434] N82-11173
Chemical heat pump program: An overview
[DE81-025086] N82-11414

THERMODYNAMIC CYCLES
Alternative heat pump cycle studies
[DE81-024983] N82-11417

THERMODYNAMIC EFFICIENCY
Heat pump R and D at Oak Ridge National Laboratory
[DE81-024121] N82-11422
Evaluation of the micro-carburetor
[NASA-CR-164958] N82-11994

THERMODYNAMIC PROPERTIES
Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76608] N82-11120
A compilation of thermodynamic and transport properties of aqueous sulfuric acid
[PB81-229171] N82-11172

THERMODYNAMICS
Journal of Engineering Thermophysics (selected articles)
[AD-A105604] N82-11023
Application of solidification theory to rapid solidification processing --- alloys and metallic glasses
[AD-A104561] N82-11214

THERMOELECTRIC GENERATORS
Controls for solar heating and cooling
[DE81-025209] N82-11593

THERMOELECTRIC POWER GENERATION
Review of thermally regenerative electrochemical systems, volume 2
[DE81-029624] N82-11572

THERMOELECTRICITY
Review of thermally regenerative electrochemical systems, volume 2
[DE81-029624] N82-11572

THERMOMECHANICAL TREATMENT
Fatigue characteristics and microstructural analysis of thermomechanically-processed, high-magnesium aluminum-magnesium alloy
[AD-A104589] N82-11189

THERMONUCLEAR REACTIONS
Uncertainties associated with inertial-fusion ignition
[DE81-025408] N82-11944

THERMOPLASTIC RESINS
Microstructure of amorphous and semi-crystalline polymers
[AD-A102853] N82-11216

THERMOSPHERE
Rocket data of solar EUV flux, thermospheric electron flux and N2 second-positive airglow emission
[AD-A104384] N82-11703

THIN FILMS
Determination of exact orientation relationships between martensite and austenite in steels by microdiffraction
[LBL-12289] N82-11195
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027254] N82-11558
Impurity effects in a-Si:H solar cells
[DE81-025069] N82-11575
Low-cost solar flat-plate collector development
[DE81-025081] N82-11584
Thin-film polycrystaline silicon solar cells: Progress and problems
[DE81-025704] N82-11608
Analysis of indium-phosphide/indium tin oxide solar cells
[DE81-025907] N82-11610

THIN PLATES
Eddy current flows around cracks in thin plates for nondestructive testing
[AD-A104407] N82-11481

THORIUM COMPOUNDS
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170

THREE DIMENSIONAL FLOW
Acta mechanica sinica
[AD-A105184] N82-11014
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted N82-11015
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor N82-11025
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

THROATS
Design of throat section of conical corrugated horns N82-11292

THROMBIN
Participation of the hypophyseal-adrenal cortex system in thrombin clearance during immobilization stress
[NASA-TM-76729] N82-11760

THRUST VECTOR CONTROL
Optimal control in the lunar module digital autopilot N82-11085
THUNDERSTORMS
A comparison of two methods for forecasting thunderstorms at Luke Air Force Base, Arizona [PB81-225393] N82-11746
TIDEPOWER
Ocean energy-waves, currents, and tides [DE81-025708] N82-11611
TIDES
On the computation of barotropic tides in deep estuaries with application to Knight Inlet, British Columbia [PB81-220147] N82-11754
Time dependent mixing in a salt wedge estuary N82-11755
TILES
Dynamic Moire methods for detection of loosened space shuttle tiles [NASA-TM-83205] N82-11434
TIME
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft [NASA-TM-83214] N82-11860
TIME DEPENDENCE
Vibrational sensitization of of 14N14NO, 15N14NO and H2O by laser excited SF6 N82-11143
Time dependent mixing in a salt wedge estuary N82-11755
TIME MEASUREMENT
Analytical description of time characteristics of high power laser pulses N82-11448
TIME SERIES ANALYSIS
Validation of a Monte Carlo simulation of binary time series [AD-A104525] N82-11838
Properties of batch means from stationary ARMA (1, 1) time series [AD-A104245] N82-11839
TIN COMPOUNDS
Coal hydrogenation via bonding of metallic compounds to coal, part 1. Solubilization of Illinois bituminous coal - the critical importance of methylene group cleavage, part 2 [DE81-027562] N82-11236
TIN OXIDES
Analysis of indium-phosphide/indium tin oxide solar cells [DE81-025907] N82-11610
TISSUES (BIOLOGY)
Altered tissue reactivity and interactions between chemicals [DE81-023189] N82-11777
TITANIUM ALLOYS
Materials considerations relative to multibarrier waste isolation [DE81-029104] N82-11894
TITANIUM CARBIDES
Coated-limiter testing in Tokamaks [DE81-027665] N82-11951
TOKAMAK DEVICES
Magneto-optically modulated CH3OH laser for Faraday rotation measurements in Tokamaks [DE81-027298] N82-11462
Guide to the data-acquisition software of the Doublet III computer system [DE81-026616] N82-11813
Boosting up of neutral beam heating power by slowly rising toroidal field --- compression [IPPJ-534] N82-11929
Ion thermal conductivity for a pure Tokamak plasma [DE81-029710] N82-11932
Antenna-plasma coupling theory for ICRF heating of large Tokamaks [DE81-029815] N82-11933
RF-driven Tokamak reactor with sub-ignited, thermally stable operation [DE81-029437] N82-11935
Source-to-incident-flux relation in a Tokamak blanket module [DE81-026524] N82-11941
Preliminary activation calculations for the poloidal divertor experiment [DE81-026525] N82-11942
Plasma assessments for the Fusion Engineering Device (FED) [DE81-024254] N82-11948
Coated-limiter testing in Tokamaks [DE81-027665] N82-11951
TOPOGRAPHY
Geologic considerations in underground coal mining system design [NASA-CR-164961] N82-11516
Conceptual design of a computer-generated topographic display system to aid mission planning and mission conduct by Army aviators [AD-A104388] N82-11517
TOPOLOGY
Homeomorphisms of some direct limit spaces N82-11848
TOROIDAL PLASMAS
The effects of toroidal geometry and scattering by density fluctuations on the accessibility and energy deposition of lower hybrid waves N82-11922
Theory of drift instabilities and the associated anomalous transport [IPPJ-REV-1] N82-11924
An energy integral and variational principle for plasma kinetic modes [IPPJ-531] N82-11926
Boosting up of neutral beam heating power by slowly rising toroidal field --- compression [IPPJ-534] N82-11929
Ion thermal conductivity for a pure Tokamak plasma [DE81-029710] N82-11932
TORSIONAL STRESS
Failure analysis of a tool steel torque shaft [NASA-TM-82758] N82-11184
TOXIC HAZARDS
Outgassing of two synthetic fuels [AD-A104580] N82-11231
Low-Btu-gasifier emissions toxicology [DE81-031000] N82-11651
Assessment of hazard potential from combustion of wastes in industrial boilers [PB81-221889] N82-11656
Carbon/graphite fibers: Environmental exposures and potential health implications [PB81-229692] N82-11780
TRACE ELEMENTS
Speciation of labile and quasi-labile metal complex systems using the Kalman filter [DE81-025678] N82-11194
Proof of concept study [AD-A104338] N82-11639
Trace-element and phase relations in fly ash [DE81-028555] N82-11643
Stratospheric trace gas composition studies utilizing in situ cryogenic, whole-air sampling methods [AD-A104375] N82-11689
TRACKING STATIONS
NOCA upgrade N82-11304
Special activity utilization of GDSCC antennas during 1980 N82-11307
An optimization model for energy generation and distribution in a dynamic facility N82-11310
TRAILING EDGES
Aircraft wing trailing-edge noise [NASA-CR-164952] N82-11039
Helicopter rotor trailing edge noise --- noise prediction [NASA-CR-3470] N82-11859
TRAINING EVALUATION
Determining the training effectiveness and cost-effectiveness of visual flight simulators for military aircraft [AD-A104627] N82-11091
TRAJECTORIES
Algorithm for fuel conservative horizontal capture trajectories [NASA-TM-81334] N82-11018
TRAJECTORY CONTROL
Flight trajectory control investigation [AD-A104542] N82-11048
Optimum climb and descent trajectories for airline missions N82-11082
TRANSDUCERS
Engineering Analysis System (EASY) [DE81-027508] N82-11846
TRANSFORMATIONS (MATHEMATICS)
The Bogoliubov transformation and its application to cosmological particle production N82-12009
TRANSFORMERS
High-voltage air-core pulse transformers [DE81-030999] N82-11370
TRANSIENT RESPONSE
Transient temperature response of strain gages [DE81-031922] N82-11440
TRANSISTOR AMPLIFIERS
Low noise tuned amplifier [NASA-CASE-GSC-12567-1] N82-11359
TRANSITION FLOW
Investigation of heat transfer in straight and curved rectangular ducts for laminar and transition flows [AD-A104604] N82-11401
TRANSITION METALS
Trace-element and phase relations in fly ash [DE81-028555] N82-11643
TRANSMISSION LINES
Conductor fatigue-life research [DE81-904209] N82-11369
Test results of ac superconducting cables [BNL-29291] N82-11371
TRANSMISSION LOSS
Study of microstrip antenna elements, arrays, feeds, losses, and applications [AD-A104493] N82-11343
An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857
TRANSONIC COMPRESSORS
Journal of Engineering Thermophysics (selected articles) [AD-A105604] N82-11023
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor N82-11025
TRANSONIC FLOW
Acta Mechanica Sinica (selected articles) [AD-A105636] N82-11019
On transonic flow in hyperbolic Laval nozzles --- the conformal curvilinear coordinate method N82-11020
Calculations of transonic potential flow over cascades [NASA-CR-165471] N82-11041
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings [NASA-TM-81331] N82-11054
TRANSONIC SPEED
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016
TRANSPONDERS
Threat Alert and Collision Avoidance System (TCAS) Symposium [AD-A104563] N82-11047
TRANSPORT AIRCRAFT
Control law design for transport aircraft flight tasks N82-11080
TRANSPORT PROPERTIES
A compilation of thermodynamic and transport properties of aqueous sulfuric acid [PB81-229171] N82-11172
Transport characteristics of alternate slurry fuels [DE81-028580] N82-11255
Theory of drift instabilities and the associated anomalous transport [IPPJ-REV-1] N82-11924
TRAPPED PARTICLES
Trapping and release of implanted D/H ions in fused silica [DE81-024441] N82-11974
TRAPPING
Trapping and release of implanted D/H ions in fused silica [DE81-024441] N82-11974
TRAVELING IONOSPHERIC DISTURBANCES
Effect of energetic particle events on VLF/LF propagation parameters, 1974 - 1977 [AD-A104508] N82-11344
TRIBOLOGY
Universal binding energy relations in metallic adhesion [NASA-TM-82706] N82-11183
TRIMETHYL COMPOUNDS
The stability of new transparent polymeric materials: The epoxy trimethoxyboroxine system. Part 1: The preparation, characterization and curing of epoxy resins and their copolymers [NASA-CR-164951] N82-11208
TRITIUM
Hydrogen storage-bed design for tritium systems test assembly [DE81-025336] N82-11262

Tritium induced X-ray emission from glass shell inertial fusion targets
[DE81-025599] N82-11936

TROPICAL STORMS
Tropical storm movement based on synoptic map typing using empirical orthogonal functions
[AD-A104591] N82-11728

TROPOSPHERE
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637

TRUSSES
Study of foldable elastic tubes for large space structure applications, phase 3
[NASA-CR-164929] N82-11493

TUNABLE LASERS
Two-dimensional theory and simulation of free electron lasers
[DE81-025365] N82-11461

TUNGSTEN
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900

TUNING
Low noise tuned amplifier
[NASA-CASE-GSC-12567-1] N82-11359

TURBINE BLADES
A new method of cooling turbine vanes N82-11027
Analytical and experimental study of flow phenomena in noncavitating rocket pump inducers
[NASA-CR-3471] N82-11031
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182

TURBINE ENGINES
Development of multivariable controllers for aircraft turbine engines N82-11087

TURBINE PUMPS
Analytical and experimental study of flow phenomena in noncavitating rocket pump inducers
[NASA-CR-3471] N82-11031
Firefighting module development
[NASA-TM-82444] N82-11311
Advanced superposition methods for high speed turbopump vibration analysis
[NASA-CR-165379] N82-11465
Liquid oxygen turbopump technology
[NASA-CR-165487] N82-11468

TURBINES
Wind ripple analysis
[DE81-030129] N82-11044

TURBOCOMPRESSORS
Journal of Engineering Thermophysics (selected articles)
[AD-A105604] N82-11023
A theoretical analysis of the stream surface of *revolution with supersonic inlet flow in a transonic axial* compressor N82-11025

TURBOFAN ENGINES
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

TURBOGENERATORS
Lewis Research Center's coal-fired, pressurized, fluidized-bed reactor test facility
[NASA-TM-81616] N82-11397

TURBOMACHINERY
Acta mechanica sinica
[AD-A105184] N82-11014
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the *S sub 1-surface twisted* N82-11015
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. *Volume 9: Design approaches: CAES, appendix C.* Major mechanical equipment
[DE81-030672] N82-11621

TURBULENCE
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036

TURBULENT BOUNDARY LAYER
Acta Mechanica Sinica (selected articles)
[AD-A105636] N82-11019
Prediction of turbulent boundary layer separation N82-11022
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade N82-11024

TURBULENT FLOW
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen N82-11026
A new method of cooling turbine vanes N82-11027
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
A three-dimensional simulation of transition and early turbulence in a time-developing mixing layer
[NASA-CR-164942] N82-11393
Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394
Higher-level simulations of turbulent flows
[NASA-CR-164936] N82-11395
Numerical simulation of a compressible homogeneous, turbulent shear flow
[NASA-CR-164953] N82-11396
Maximal entropy in fluid and plasma turbulence: A review
[DE81-025388] N82-11946

TURBULENT JETS
Temperature measurement in turbulent arcs N82-11921

TURBULENT MIXING
A three-dimensional simulation of transition and early turbulence in a time-developing mixing layer
[NASA-CR-164942] N82-11393
Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394
Time dependent mixing in a salt wedge estuary N82-11755

TWO DIMENSIONAL FLOW
Theoretical investigations and experimental researches for higher subsonic two-dimensional *compressor cascade* N82-11024
Research on the recirculating flow rate in the wake of two-dimensional flame stabilizers (under cold conditions) N82-11028
Some observations on a new numerical method for solving Navier-Stokes equations
[NASA-TP-1934] N82-11032
A wake source model for non-symmetric flow past bluff bodies in two-dimensional flow
[C-OF-A-MEMO-8109] N82-11037
Analyses of ductile flow and fracture in two dimensions
[DE81-023651] N82-11506

TWO PHASE FLOW
Two-phase flow in geothermal energy sources
[DE81-029037] N82-11404

U

U.S.S.R.
Unique characteristics of financing science in the USSR
[PB81-212243] N82-11980

U.S.S.R. SPACE PROGRAM
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097

ULTRASHORT PULSED LASERS
Laser triggered spark gaps under experimental study N82-11451

ULTRASONIC RADIATION
Optical fiber interferometer for the study of ultrasonic waves in composite materials
[NASA-CR-164916] N82-11121
Detection of ultrasonic waves in solids by an optical fiber interferometer N82-11123
DC calibration of the strain sensitivity of a single mode optical fiber interferometer N82-11124
Detection of acoustic emission in composites by optical fiber interferometry N82-11125
Pulsed-echo interface wave characterization of bolted plates N82-11126
Wideband optical measurements of ultrasonic pulses N82-11132

ULTRASONIC TESTS
Digital ultrasonics signal processing: Flaw data post processing use and description
[NASA-CR-161882] N82-11862

ULTRASONIC WAVE TRANSDUCERS
Optical fiber interferometer for the study of ultrasonic waves in composite materials
[NASA-CR-164916] N82-11121
Optical fiber interferometer for the study of ultrasonic waves in composite materials, discussion N82-11122
Detection of ultrasonic waves in solids by an optical fiber interferometer N82-11123
Pulsed-echo interface wave characterization of bolted plates N82-11126
Attenuation of ultrasonic interface waves on metal-polymer-metal boundaries N82-11127
Characterization of metal-polymer boundaries using Stoneley and Leaky waves N82-11128
Waves guided by a thin viscoelastic layer between elastic solids N82-11129
An ultrasonic transducer with Gaussian radial velocity distribution N82-11130
Dual differential interferometer for measurements of broadband surface acoustic waves N82-11133

ULTRAVIOLET ASTRONOMY
Optical and ultraviolet studies of stellar chromospheres of lambda Andromedae and other late-type stars N82-12003

ULTRAVIOLET RADIATION
Rocket data of solar EUV flux, thermospheric electron flux and N2 second-positive airglow emission
[AD-A104384] N82-11703

UNDERGROUND STORAGE
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8: Design approaches: UPH
[DE81-030673] N82-11620
Preliminary design study of underground pumped *hydro and compressed-air energy storage in hard rock.* Volume 9: Design approaches: CAES, appendix C. Major mechanical equipment
[DE81-030672] N82-11621
Evaluation of uncertainties in geologic information
[DE81-025997] N82-11714
Zircaloy cladding: Tough containment for spent fuel storage
[DE81-024105] N82-11896

UNDERGROUND TRANSMISSION LINES
Acoustic waveguide technique for sensing incipient faults in underground power-transmission cables: *Including acousto-optic techniques*
[DE81-029626] N82-11381
Research to develop guidelines for cathodic *protection of concentric neutral cables, volume 1 —* underground transmission lines
[DE81-904195] N82-11382
Research to develop guidelines for cathodic protection of concentric neutral cables, volume 2 — potential gradients and polarization curves
[DE81-904210] N82-11383

UNDERWATER COMMUNICATION
Investigation of the strength of shielded and *unshielded underwater electrical cables*
[AD-A104314] N82-11364

UNIFORM FLOW
Generation of axi-symmetric body shapes in subsonic flow by means of polynomial distributions of sources and doublets along the axis of symmetry
[C-OF-A-MEMO-8110] N82-11038

UNITED STATES OF AMERICA
Electric power supply and demand for the contiguous United States, 1981 - 1990
[DE81-027126] N82-11376
Workbook for estimating the climatology of regional *continental scale atmospheric dispersion and* deposition over the United States
[PB81-224172] N82-11748

UNSTEADY FLOW
Some problems in the calculation of flows with tangential discontinuities
[RAE-LIB-TRANS-2059] N82-11389

UPGRADING
Brookhaven National Laboratory Tandem accelerator upgrading program
[DE81-025093] N82-11897
UPPER ATMOSPHERE
Rocket data of solar EUV flux, thermospheric electron flux and N2 second-positive airglow emission
[AD-A104384] N82-11703
Design and fabrication of quadrupole ion mass spectrometer for upper atmosphere
[AD-A104319] N82-11705
US Monsoon Experiment MONEX rawinsonde/radiometersonde system
[PB81-222937] N82-11736
URANIUM COMPOUNDS
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170
Hydrogen storage-bed design for tritium systems test assembly
[DE81-025336] N82-11262
URBAN DEVELOPMENT
Adaptation of land use to surficial geology in metropolitan Washington, D.C. N82-11718
URBAN PLANNING
Modeling energy-conservation potentials of community energy-system technologies
[DE81-026059] N82-11589
URBAN RESEARCH
Urban ecosystem and resource-conserving urbanism in Third World cities
[DE81-029854] N82-11995
USER MANUALS (COMPUTER PROGRAMS)
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program
[AD-A104546] N82-11499
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program
[AD-A104547] N82-11500
Guide to the data-acquisition software of the Doublet III computer system
[DE81-026616] N82-11813
USER REQUIREMENTS
Conceptual design for a multi-user medium BTU coal gasification complex. Volume 1: Executive summary
[DE81-027139] N82-11238
User needs for solar decision-making tools: The homebuilding industry
[DE81-027293] N82-11325
Microfiche as a vehicle for technical reports
[PB81-228009] N82-11986
UTAH
Precipitation characteristics of summer storms at Straight Canyon barometer, Watershed, Utah
[PB81-223950] N82-11750
UTILITIES
Project demonstration of wind-turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE81-030950] N82-11380
Analysis of the fuel and cost effects of interfacing utilities and small-power cogenerators
[DE81-028495] N82-11579

V

V/STOL AIRCRAFT
Low speed testing of the inlets designed for a tamden-fan V/STOL nacelle --- conducted in the Lewis 10 by 10 foot wind tunnel
[NASA-TM-82728] N82-11042
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
VACANCIES (CRYSTAL DEFECTS)
Negative-U for point defects in silicon
[AD-A104482] N82-11966
Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron
[DE81-025540] N82-11973
VALENCE
Statistical versus valence neutron neutron capture in Mo-98
[DE81-023943] N82-11880
VAN DE GRAAFF ACCELERATORS
Brookhaven National Laboratory Tandem accelerator upgrading program
[DE81-025093] N82-11897
VAPOR PHASES
Response of portable VOC analyzers to chemical mixtures
[PB81-234262] N82-11176
VARIABLE PITCH PROPELLERS
Yawing of wind turbines with blade cyclic pitch variation
[DE81-030091] N82-11045
VARIABLE STARS
Nonradial pulsations of upsilon Orionis and supergiants
[DE81-025338] N82-12005
Theoretical and observational aspects of stellar variability N82-12007
VARIANCE (STATISTICS)
Removal of drift from frequency stability measurements N82-11298
VARIATIONAL PRINCIPLES
An energy integral and variational principle for plasma kinetic modes
[IPPJ-531] N82-11926
VECTOR SPACES
Vector integrals and products of vector measures N82-11847
VEGETATION
Use of a vegetative filter zone to control fine-grained sediments from surface mines
[PB81-226110] N82-11674
Geothermal environmental assessment baseline study: Vegetation and soils of the Roosevelt Hot Springs geothermal resource area
[PB81-223299] N82-11717
Inclusion of a simple vegetation layer in terrain temperature models for thermal infrared (IR) signature prediction
[AD-A104469] N82-11910
VELOCITY MEASUREMENT
Local earthquake travel times and spatial variations of crustal velocity in southern California N82-11687
VERMONT
New Hampshire and Vermont point source inventory update for NECRMP
[PB81-219339] N82-11672
VESTIBULAR TESTS
Otolithic reflex and space perception function of cosmonauts N82-11764
VIBRATION
An inexpensive, portable vibracoring system for shallow-water and land application
[AD-A104323] N82-11314
Detection of vibrations in metallic structures using small passive magnetic fields
[AD-A104405] N82-11495
Vibration signature analysis and acoustic-emission monitoring at Brayton Point
[DE81-904232] N82-11507
VIBRATION DAMPING
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212
VIBRATION ISOLATORS
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212
VIBRATION MODE
Advanced superposition methods for high speed turbopump vibration analysis
[NASA-CR-165379] N82-11465
VIBRATIONAL SPECTRA
Stimulated Raman studies of CO2-laser-excited SF6
[DE81-025829] N82-11463
Molecular spectroscopy and relaxation in supersonic beams N82-11867
Vibrational spectra and atom-atom potentials in the crystalline state. 1: A comparison of hexasulfur, octasulfur and dodecasulfur. 2: A study of solid allene N82-11957
VINYL RADICAL
Reaction of oxygen atoms with ethylene and vinylbromide
[DE81-025206] N82-11879
VIRTUAL PROPERTIES
A simplified procedure for direct determination of real heights from virtual height data
[AD-A104374] N82-11702
VISCOELASTICITY
Waves guided by a thin viscoelastic layer between elastic solids N82-11129
Dynamic fracture in viscoelastic solids
[AD-A104687] N82-11494
VISCOSITY
Acoustic cavitation studies
[AD-A104409] N82-11863
VISCOUS FLOW
Some features of flow past slotted wings
[RAE-LIB-TRANS-2050] N82-11030
Analytical and experimental study of flow phenomena in noncavitating rocket pump inducers
[NASA-CR-3471] N82-11031
VISIBILITY
Estimates for the probabilities of surface-to-air cloud-free lines-of-sight and low cloud statistics from ship observations. Part 1: Fifteen marine locations
[AD-A104633] N82-11730
VISIBLE SPECTRUM
Optical and ultraviolet studies of stellar chromospheres of lambda Andromedae and other late-type stars N82-12003
VISUAL FLIGHT
Determining the training effectiveness and cost-effectiveness of visual flight simulators for military aircraft
[AD-A104627] N82-11091
VITRIFICATION
Evaluation and review of alternative waste forms for immobilization of high-level radioactive wastes
[DE81-026323] N82-11909
VOCODERS
Research on narrowband communications
[AD-A104296] N82-11345
VOICE COMMUNICATION
Research on narrowband communications
[AD-A104296] N82-11345
Packet Speech Systems Technology
[AD-A104373] N82-11348
VOIDS
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
VOLATILITY
Response of portable VOC analyzers to chemical mixtures
[PB81-234262] N82-11176
Preignition volatile yield as related to coal characteristics
[DE81-027584] N82-11250
VOLCANOES
Airborne radiological sampling of Mount St. Helens plumes
[PB81-213795] N82-11659
VOLTAGE REGULATORS
Motor power factor controller with a reduced voltage starter
[NASA-CASE-MFS-25586-1] N82-11360
VOLUME
The volumes and heat capacities of nonelectrolytes and organic electrolytes in methanol at 25 C N82-11142
VORTEX FLAPS
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
VORTICES
Some problems in the calculation of flows with tangential discontinuities
[RAE-LIB-TRANS-2059] N82-11389
Maximal entropy in fluid and plasma turbulence: A review
[DE81-025388] N82-11946
Acta Mechania Sinica
[AD-A105635] N82-12021
Difference method in fluid dynamics. 1. Numerical solution of two dimensional vorticity equation N82-12022

W

WAFERS
Scriber for silicon wafers
[NASA-CASE-NPO-15539-1] N82-11469

WAKES
Some features of flow past slotted wings
[RAE-LIB-TRANS-2050] N82-11030
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036
A wake source model for non-symmetric flow past bluff bodies in two-dimensional flow
[C-OF-A-MEMO-8109] N82-11037
WALL PRESSURE
Novel design of pressure vessels and thermal shields in coal gasifiers
[DE81-025828] N82-11474
WALLS
Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing
[AD-A104562] N82-11402
WARFARE
Where are we in the space war?
[NASA-TM-76604] N82-11096
WARM FRONTS
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-76617] N82-11725
WARNING SYSTEMS
Threat Alert and Collision Avoidance System (TCAS) Symposium
[AD-A104563] N82-11047
A systems approach to the real-time runoff analysis with a deterministic rainfall-runoff model
[PB81-224495] N82-11530
Recovery of seismic signals in noise by adaptive processing
[DE81-029469] N82-11713
Equipment for flood and flash flood warning systems
[PB81-224131] N82-11749
WASHINGTON
Index to observations of currents in Puget Sound, Washington, from 1908-1980
[PB81-224115] N82-11753
WASTE DISPOSAL
Solid and hazardous energy wastes: Synfuels. 1: Review of research activities
[DE81-028503] N82-11644
Sulfur pollution control. Phase 1: The disposal program
[PB81-222612] N82-11652
Evaluation of uncertainties in geologic information
[DE81-025997] N82-11714
Analysis of space systems study for the space disposal of nuclear waste study report. Volume 2: Technical report
[NASA-CR-161888] N82-11889
International safeguards for spent fuel storage
[DE81-029896] N82-11892
Uncertainty analysis for geologic disposal of radioactive waste
[DE81-027206] N82-11893
Materials considerations relative to multibarrier waste isolation
[DE81-029104] N82-11894
Zircaloy cladding: Tough containment for spent fuel storage
[DE81-024105] N82-11896
WASTE ENERGY UTILIZATION
Vertical combustor for refuse combustion
[DE81-030002] N82-11152
Feasibility and economic study of medium-BTU coal gas blended with high-BTU by product gas as an industrial energy source at Billings, Montana
[DE81-025166] N82-11237
Production and utilization of methane from anaerobic sludge digestion in U.S. wastewater-treatment plants
[DE81-029958] N82-11246
Cycle and performance analysis of absorption heat pumps for waste heat utilization
[DE81-030705] N82-11405
Fluid-bed heat-exchanger optimization and bed materials selection
[DOE/ET-11343/T2] N82-11571
Residual-energy-applications program: EAST-facility requirements document
[DE81-027489] N82-11616
WASTE TREATMENT
Waste-assimilation capacity of the Arkansas River in Pueblo County, Colorado, as it relates to water-quality guidelines and stream classification
[PB81-227340] N82-11540
EPA utility FGD (Flue Gas Desulfurization) survey
[PB81-225773] N82-11679
Comparison of costs for solidification of high-level radioactive waste solutions: Glass monoliths vs. metal matrices
[ANL-80-121] N82-11890
Use of polyethers in the treatment of acidic high-activity nuclear wastes
[DE81-027087] N82-11895
Evaluation and review of alternative waste forms for immobilization of high-level radioactive wastes
[DE81-026323] N82-11909
WASTE UTILIZATION
Assessment of hazard potential from combustion of wastes in industrial boilers
[PB81-221889] N82-11656
WASTE WATER
Production and utilization of methane from anaerobic sludge digestion in U.S. wastewater-treatment plants
[DE81-029958] N82-11246
Magma Cooling-Tower process pilot-plant demonstration
[DE81-903783] N82-11406
WASTES
Survey of particulate emission macro- and micro-sampling and sizing methods
[DE81-028348] N82-11642
WATER COLOR
Development of the coastal zone color scanner for NIMBUS 7. Volume 1: Mission objectives and instrument description
[NASA-CR-166720-VOL-1] N82-11511
WATER CURRENTS
Index to observations of currents in Puget Sound, Washington, from 1908-1980
[PB81-224115] N82-11753
WATER FLOW
Firefighting module development
[NASA-TM-82444] N82-11311
Studies of heat transfer and water migration in soils
[DE81-023951] N82-11425
WATER HEATING
Lightweight concrete materials and structural systems for water tanks for thermal storage
[COO-4703-26] N82-11501
The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute
[PB81-226813] N82-11625
WATER MANAGEMENT
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734
WATER POLLUTION
Detection of oil in water by a flame emission technique
[PB81-226185] N82-11178
Temperature and solute-transport simulation in streamflow using a Lagrangian reference frame
[PB81-225757] N82-11543
Industrial process fugitive emissions inventory for the Region V Great Lakes shoreline
[PB81-212037] N82-11658
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669
WATER PRESSURE
Conditional sampling of oceanic temperature and pressure
[AD-A104539] N82-11751
WATER QUALITY
Raft River geothermal project groundwater monitoring program
[DE81-030202] N82-11521
Water resources of upper separation creek basin, south-central Wyoming
[PB81-224263] N82-11531
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534
Water resources data for Tennessee, water year 1979
[PB81-228249] N82-11539
Waste-assimilation capacity of the Arkansas River in Pueblo County, Colorado, as it relates to water-quality guidelines and stream classification
[PB81-227340] N82-11540
Water resources data for Maine, water year 1980
[PB81-226789] N82-11541
Water resources data for Oregon, water year 1979
[PB81-226771] N82-11542
Nitrogen dynamics in a lagoon development and an adjacent salt marsh N82-11632
Stabilization characteristics of deposits of biologic solids generated in aerated lagoons
[PB81-224297] N82-11668
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 1
[PB81-225286] N82-11675
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 2
[PB81-225294] N82-11676
Automated water monitor system field demonstration test report. Volume 1: Executive summary
[NASA-CR-166228] N82-11991
Automated water monitor system field demonstration test report. Volume 2: Technical summary
[NASA-CR-166229] N82-11992
WATER RECLAMATION
Automated water monitor system field demonstration test report. Volume 1: Executive summary
[NASA-CR-166228] N82-11991
Automated water monitor system field demonstration test report. Volume 2: Technical summary
[NASA-CR-166229] N82-11992
WATER RESOURCES
Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269
Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270
Synthetic fuel development for the Upper Missouri River Basin. Section 13: Water assessment report
[PB81-224537] N82-11276
Great Plains gasification project, Mercer County, North Dakota; water assessment report section 13(c)
[PB81-216111] N82-11524
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525
Water resources data for Kentucky, water year 1980
[PB81-223612] N82-11526
Water resources data for Michigan, water year 1980
[PB81-224180] N82-11527
Water resources data for Ohio, water year 1980. Volume 2: St. Lawrence River basin
[PB81-217077] N82-11528
Water resources of upper separation creek basin, south-central Wyoming
[PB81-224263] N82-11531
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534
Water resources data for Tennessee, water year 1979
[PB81-228249] N82-11539
Water resources data for Maine, water year 1980
[PB81-226789] N82-11541
Water resources data for Oregon, water year 1979
[PB81-226771] N82-11542
WATER RUNOFF
A systems approach to the real-time runoff analysis with a deterministic rainfall-runoff model
[PB81-224495] N82-11530
Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado
[PB81-224313] N82-11667
WATER TABLES
Water resources data for Maine, water year 1980
[PB81-226789] N82-11541
WATER TEMPERATURE
Temperature and solute-transport simulation in streamflow using a Lagrangian reference frame
[PB81-225757] N82-11543
Conditional sampling of oceanic temperature and pressure
[AD-A104539] N82-11751

WATER TREATMENT
Magma Cooling-Tower process pilot-plant demonstration
[DE81-903783] N82-11406
Sewage sludge additive
[NASA-CASE-NPO-13877-1] N82-11634
WATER WAVES
Critical wave conditions for sand motion initiation
[AD-A104376] N82-11400
Ocean energy-waves, currents, and tides
[DE81-025708] N82-11611
Wave propagation over rectangular trench
[PB81-220782] N82-11752
WATERSHEDS
Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado
[PB81-224313] N82-11667
Precipitation characteristics of summer storms at Straight Canyon barometer, Watershed, Utah
[PB81-223950] N82-11750
WATERWAVE ENERGY CONVERSION
Ocean energy-waves, currents, and tides
[DE81-025708] N82-11611
WAVE AMPLIFICATION
Frontogenesis in the planetary boundary layer of an amplifying, two-dimensional baroclinic wave N82-11721
WAVE DIFFRACTION
Acta mechanica sinica
[AD-A105184] N82-11014
The wave diagrams for diffraction and reflection of a traveling weak shock wave from an open end of a shock tube N82-11017
WAVE DISPERSION
Two-dimensional theory and simulation of free electron lasers
[DE81-025365] N82-11461
WAVE INTERACTION
Imperfect magnetosphere-ionosphere coupling and discrete auroras
[AD-A104509] N82-11699
Nonlinear waves on charged particle beams N82-11865
WAVE PROPAGATION
Characterization of metal-polymer boundaries using Stoneley and Leaky waves N82-11128
Waves guided by a thin viscoelastic layer between elastic solids N82-11129
The deep space optical channel. 2: Wave propagation effects N82-11288
Wave propagation over rectangular trench
[PB81-220782] N82-11752
Oblique propagation of electron thermal modes below the electron plasma frequency without boundary effects
[IPPJ-533] N82-11928
WAVE REFLECTION
Acta mechanica sinica
[AD-A105184] N82-11014
The wave diagrams for diffraction and reflection of a traveling weak shock wave from an open end of a shock tube N82-11017
WAVE SCATTERING
The effects of toroidal geometry and scattering by density fluctuations on the accessibility and energy deposition of lower hybrid waves N82-11922
Stimulated Raman scattering in large plasmas
[DE81-026589] N82-11938
WAVEGUIDES
Design of throat section of conical corrugated horns N82-11292
Local distribution fiber optic cable communication system
[AD-A104491] N82-11911
WEATHER
Strategies for weather-dependent data acquisition N82-11286
WEATHER FORECASTING
Operational environment, meteorological conditions and weather forecasting N82-11057
A systems approach to the real-time runoff analysis with a deterministic rainfall-runoff model
[PB81-224495] N82-11530
A numerical dynamical investigation of the role of subsynoptic inertial an isallobaric adjustments in organizing severe local storm ensembles N82-11719
Tropical storm movement based on synoptic map typing using empirical orthogonal functions
[AD-A104591] N82-11728
An open-ocean marine fog development and forecast model for Ocean Weather Station Papa
[AD-A104595] N82-11729
A comparison of two methods for forecasting thunderstorms at Luke Air Force Base, Arizona
[PB81-225393] N82-11746
WEATHER MODIFICATION
Meteorological Effects of Thermal Energy Releases (METER) program
[DE81-030431] N82-11640
WEATHER STATIONS
An open-ocean marine fog development and forecast model for Ocean Weather Station Papa
[AD-A104595] N82-11729
WEDGES
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036
WEIBULL DENSITY FUNCTIONS
Estimation problems associated with the Weibull distribution
[DE81-030466] N82-11841
WEIGHTING FUNCTIONS
A comparison of weighting techniques for SAW transducers at UHF
[AD-A104510] N82-11362
WELLS
Two-phase flow in geothermal energy sources
[DE81-029037] N82-11404
Well-water-source heat pump field performance study
[DE81-024136] N82-11419
WEST VIRGINIA
Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269
Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270
WHITE DWARF STARS
Theoretical and observational aspects of stellar variability N82-12007
WIND (METEOROLOGY)
The wind climatology of American Samoa
[PB81-221012] N82-11733
WIND EFFECTS
Wind ripple analysis
[DE81-030129] N82-11044
Conductor fatigue-life research
[DE81-904209] N82-11369
WIND TUNNEL APPARATUS
Space shuttle solid rocket booster sting interference wind tunnel test analysis
[NASA-CR-161885] N82-11040
WIND TUNNEL MODELS
Space shuttle solid rocket booster sting interference wind tunnel test analysis
[NASA-CR-161885] N82-11040
WIND TUNNEL NOZZLES
Wind tunnel supplementary Mach number minimum section insert
[NASA-CASE-LAR-12532-1] N82-11088
WIND TUNNEL TESTS
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
Space shuttle solid rocket booster sting interference wind tunnel test analysis
[NASA-CR-161885] N82-11040
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069
Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing
[AD-A104562] N82-11402
Helicopter rotor trailing edge noise --- noise prediction
[NASA-CR-3470] N82-11359
WIND VARIATIONS
Wind ripple analysis
[DE81-030129] N82-11044
WINDPOWERED GENERATORS
Wind ripple analysis
[DE81-030129] N82-11044
Yawing of wind turbines with blade cyclic pitch variation
[DE81-030091] N82-11045
Project demonstration of wind-turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE81-030950] N82-11380
Site selection for small wind energy conversion systems for US Department of Energy field evaluation program
[PB81-226862] N82-11624
WING LOADING
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
WING PROFILES
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070
WING ROOTS
Acta mechanica sinica
[AD-A105184] N82-11014
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016
WING SLOTS
Some features of flow past slotted wings
[RAE-LIB-TRANS-2050] N82-11030
WING TANKS
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224
WINGS
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039
On the kernel function collocation method in steady subsonic flow for wing with control surfaces N82-12023
WINTER
Ice conditions in the eastern Bering Sea from NOAA and LANDSAT imagery: Winter conditions 1974, 1976, 1977, 1979
[PB81-220188] N82-11537
Meridional heat transport at the onset of winter stratospheric warming
[NASA-TM-76614] N82-11697
The 4-day temperature wave in the winter polar stratosphere N82-11720
WISCONSIN
SOLPLAN report: An assessment of barriers and incentives to conservation and alternative-energy use in the residential sector in Wisconsin
[DOE/CS-30292/3] N82-11614
WYOMING
Water resources of upper separation creek basin, south-central Wyoming
[PB81-224263] N82-11531
COCORP traverses in Wyoming and Oklahoma N82-11684

X

X RAY APPARATUS
Standard specification for apparatus for gamma radiography
[SABS-1317-1980] N82-11433
X RAY ASTRONOMY
X-ray and gamma-ray observations of pulsed emission from radio pulsars N82-12000
X RAY DIFFRACTION
High-temperature enthalpy and X-ray powder diffraction data for aluminum sulfide (Al2S)
[PB81-226250] N82-11174
X RAY FLUORESCENCE
Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177

X RAY IMAGERY
Microstructures for high-energy X-ray and particle-imaging applications
[DE81-026531] N82-11899
X RAY IRRADIATION
Molecular events basic to cellular radiation response
[DE81-027898] N82-11776
X RAY LASERS
Theoretical investigations into possible X-ray and gamma-ray lasers N82-11445
X RAY SPECTRA
Tritium induced X-ray emission from glass shell inertial fusion targets
[DE81-025599] N82-11936
X RAY SPECTROSCOPY
Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177

Y

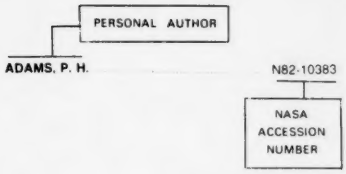
YAWING MOMENTS
Yawing of wind turbines with blade cyclic pitch variation
[DE81-030091] N82-11045

Z

ZEEMAN EFFECT
Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968
ZENITH
Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres
[NASA-CR-164930] N82-12010
ZINC
Speciation of labile and quasi-labile metal complex systems using the Kalman filter
[DE81-025678] N82-11194
ZINC ALLOYS
Activity and diffusion of metals in binary aluminum alloys
[DE81-025535] N82-11199
ZINC COMPOUNDS
Interface reactions in Mg/Zn3P2 solar cells
[DE81-025773] N82-11597
ZINC OXIDES
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE81-025587] N82-11577
ZIRCALOYS (TRADEMARK)
Zircaloy cladding: Tough containment for spent fuel storage
[DE81-024105] N82-11896

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this Index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

AAMODT, R. N82-11715
AAMODT, R. E. N82-11955
N82-11956
ABDALLA, A. M. N82-11787
ABDELRAZIK, M. N82-11510
ABEL, J. F. N82-11851
ABELSON, R. S. N82-11681
ABRAHAM, K. M. N82-11552
ACKERMANN, R. A. N82-11423
ADAM, V. N82-11080
ADAMS-VIOLA, M. N82-11156
ADAMS, M. A. N82-11209
ADAMS, P. H. N82-11440
ADAMS, R. E. W. N82-11514
AFANASYEV, O. V. N82-11765
AGUIRRE, J. N82-11825
AHMADJIAN, M. N82-11639
AIMAN, W. R. N82-11247
AKEY, N. D. N82-11515
AKHTER, M. M. N82-11087
AKINS, R. E. N82-11044
AKIYAMA, M. N82-11976
AL-NASR, N. N82-11819
ALBRECHT, S. C. N82-11674
ALEXANDER, R. H. N82-11718
ALEXANDER, S. M. N82-11936
ALEXIADES, V. N82-11410
ALI, A. W. N82-11871
ALLEN, S. L. N82-11939
ALLUISI, E. A. N82-11807
ALSMILLER, R. G., JR. N82-11949
ALTSCHULER, M. D. N82-12017
AMANO, T. N82-11929
AMIER, R. K. N82-11859
AMON, D. M. N82-11380
ANCTIL, J. C. N82-11456
ANDERHALT, R. W. N82-11630
ANDERSON, D. L. N82-11694
ANDERSON, P. R. N82-11936
ANDERSON, R. L. N82-11219
ANDERSON, W. N82-11529
ANDERSON, W. W. N82-11553
ANDERSSON, C. A. N82-11217
ANDO, Y. N82-11034
ANDREWS, J. W. N82-11413
ANDREWS, V. E. N82-11659
ANGELINI, J. J. N82-11029
ANTHES, R. A. N82-11741
ARASU, V. N82-11272
ARIOTEDJO, A. P. N82-11608
ARNETT, S. L. N82-11364
ARNOLD, E. M. N82-11411
ARNOLD, G. W. N82-11974
ARNOLD, R. N82-11902
ASAY, J. R. N82-11200
N82-11952
ASHMAN, E. N. N82-11561
AUGUSTINE, J. A. N82-11737
N82-11738
AUTON, J. R. N82-11350
N82-11351
N82-11352
AYER, R. M. N82-11752
AYERS, J. B. N82-11566
N82-11567
N82-11568
N82-11569
AZEVEDO, S. G. N82-11505

B

BABCOCK, J. B. N82-11882
BAILEY, B. H. N82-11624
BAILEY, J. W. N82-11806
BAINUM, P. M. N82-11100
BAKER, A. J. N82-11055
BAKER, E. G. N82-11258
BAKER, J. T. N82-11770
BAKER, P. C. N82-11917
BALAS, M. J. N82-11099
BALCOMB, J. D. N82-11598
N82-11602
BALDAUF, W. N82-11188
BALDRIDGE, D. N82-11540
BALICK, L. K. N82-11910
BALIK, C. M. N82-11204
BALIUNAS, S. L. N82-12003
BALL, D. N82-11420
BALLATO, A. N82-11962
BALLUFFI, R. N82-11973
BANNER, D. L. N82-11938
BAPAT, R. B. N82-11832
BARAONA, C. R. N82-11551
BARENGOLTZ, J. B. N82-11095
BARFIELD, B. J. N82-11674
BARKER, J. M. N82-11653
BARLOW, R. N82-11612
BARLOW, T. M. N82-11596
BARMATZ, M. B. N82-11861
BARNES, B. D. N82-11329
BARNES, C. A. N82-11753
BARNES, J. M. N82-11949
BARNEY, D. L. N82-11578
BARR, G. W. N82-11908
BARTH, E. A. N82-11479
N82-11480
BARTMAN, F. L. N82-11723
BASEMAN, R. J. N82-11879
BATCHELOR, R. A. N82-11361
BATCHER, K. E. N82-11801
BATES, J. F. N82-11191
BAUER, J. V. N82-11168
BAUTISTA, J. J. N82-11293
BAXTER, D. C. N82-11955
N82-11956
BAZAZYAN, G. G. N82-11760
BEARDELL, A. J. N82-11227
BEASLEY, W. D. N82-11033
BECKER, T. N82-11742
BEEBE, J. H. N82-11857
BEGG, L. L. N82-11993
BEGGS, W. C. N82-11116
BEGOVICH, C. L. N82-11774
BELAK, M. N82-11759
BELL, R. B. N82-11263
BENGTSON, T. E. N82-11824
BENNETT, L. C. N82-11355
BENYU, G. N82-12022
BERENS, A. P. N82-11496
BERGSTROM, S. L. N82-11095
BERMAN, A. L. N82-11281
BERMAN, D. N82-11103
BERMAN, S. N82-11995
BERRY, D. R. N82-11782
N82-11783
BERS, A. N82-11933
N82-11935
BERTHIER, E. N82-11459
BERTSEKAS, D. P. N82-11791
N82-11844
BESSE, A. L. N82-11108
BEUTLER, K. F. N82-11305
BHAGAVATULA, V. A. N82-11913
BICKFORD, K. J. N82-11591
BIEHL, F. A. N82-11599
BIRD, M. N82-11048
BIRD, W. L. N82-11378
BIRKETT, J. D. N82-11484
N82-11484
N82-11485
BLACK, J. M. N82-11436
BLACKFIELD, D. N82-11948
BLANKENSHIP, P. E. N82-11348
BLEDSOE, J. L. N82-11555
BLOCK, R. C. N82-11876
BLUM, R. L. N82-11987
BODA, K. N82-11759
BOETTINGER, W. J. N82-11214
BOGACHEV, I. N. N82-11186
BOHME, W. N82-11766
BOHN, T. S. N82-11942
BOLHOFER, W. C. N82-11736
BOLTON, C. W., III N82-11932
BONHAM, A. J. N82-11354
BONOLI, P. T. N82-11922
BORNSTEIN, J. N82-11213
BOROWSKI, S. K. N82-11948
BORREGO, J. M. N82-11959
BORTNIAK, J. C. N82-11733
BORTON, D. N. N82-11625
BOSI, D. M. N82-11896
BOTSARIS, G. D. N82-11156
BOUCHER, R. C. N82-11778
BOWEN, W. M. N82-11320
BOWMAN, K. O. N82-11841
BOWMAN, L. S. N82-11963
BOYD, B. A. N82-11937
BOYLE, W. N82-11040
BRADLEY, L. P. N82-11219
BRADSHAW, J. E. N82-11063
BRADY, S. N82-11849
BRANDT, H. E. N82-11931
BRASCH, J. W. N82-11471
BRENNER, D. J. N82-11885
BREWER, J. A. N82-11684
BREWER, J. E. N82-11343
BRIAN, B. W. N82-11168
BRICE, D. K. N82-11221
BRISTOWE, P. D. N82-11973
BRITT, E. J. N82-11993
BROCKINGTON, J. W. N82-11168
BROKMAN, A. W. N82-11973
BROMBERG, P. A. N82-11778
BRONISZ, S. E. N82-11891
BROOKS, R. L. N82-11991
N82-11992
BROUWERS, A. P. N82-11068
BROWN, D. W. N82-11728
BROWN, E. N. N82-11739
BROWN, G. E. N82-11176
BROWN, K. W. N82-11671
N82-11717
BROWN, L. W. N82-11051
BROWN, N. J. N82-11917
BROWN, S. D. N82-11194
BROWN, T. F. N82-11194

BROWN, W. E., JR. N82-11514
BROWN, W. S. N82-11751
BRYSON, A. E., JR. N82-11074
BUCKMAN, R. W., JR. N82-11501
BUEL, V. E. N82-11862
BUFFINGTON, A. N82-12020
BUONICONTO, M. A. N82-11943
BURESI, E. N82-11459
BURKE, H. H. K. N82-11513
BURKE, J. C. N82-11421
BURKE, R. N82-11901
N82-11902
BURLESON, R. R. N82-11476
BURNASH, R. J. C. N82-11530
BURNER, A. W. N82-11434
BURNS, E. J. T. N82-11953
BURNS, R. A. N82-11311
BURUSUZOV, R. P. N82-11765
BUSCH, G. E. N82-11943
BUSS, R. J. N82-11879
BUTMAN, S. N82-11295
BYRNE, R. N. N82-11955
N82-11956
BYSSHE, S. E. N82-11484
N82-11485

C

CACUCI, D. G. N82-11845
CADWELL, C. A., JR. N82-11189
CAHN, J. W. N82-11214
CAIN, A. B. N82-11393
CAIN, D. N82-11540
CAIRNS, E. J. N82-11595
CAMILLI, F. A. N82-11516
CAMPANY, A. D. N82-11465
CAMPBELL, C. E. N82-11484
N82-11485
CAMPBELL, S. A. N82-11970
CAMPBELL, T. N82-11995
CAMPILLO, A. J. N82-11160
CANDY, J. V. N82-11505
CANNON, G. A. N82-11753
CANTRELL, J. H., JR. N82-11123
N82-11124
N82-11132
CARDER, B. M. N82-11378
CARINI, P. N82-11870
CARLSON, C. N82-11897
CARLSON, D. E. N82-11557
N82-11558
CARLSON, E. G. N82-11626
CARLTON, R. E. N82-11890
CARMICHAEL, J. N82-11635
CARPENTER, J. F. N82-11215
CARR, M. J. N82-11159
CARTER, J. E. N82-11403
CARY, J. R. N82-11461
CASKEY, G. R., JR. N82-11197
CASPER, T. A. N82-11939
CASTELLA, G. C. N82-11943
CASTER, D. M. N82-11194
CATALANO, A. N82-11597
CATAN, M. A. N82-11583
CATTO, P. J. N82-11955
N82-11956
CEGLIO, N. M. N82-11899
CHABOCHE, J. L. N82-11487
CHAMIS, C. C. N82-11491
CHANG, S. K. N82-11347
CHAOSHUN, P. N82-11451
CHARATIS, G. N82-11943
CHARNG, T. N82-11146
CHATTERJEE, A. P. N82-11966
CHATTERJEE, J. S. N82-11339
CHATTERTON, N. E. N82-11544
CHAU, H. N82-11374
CHEEK, G. C. N82-11608
CHELNAYA, N. A. N82-11757
CHEN, C. K. N82-11967
CHEN, E. S. N82-11188
CHEN, F. C. N82-11619
CHEN, W. L. N82-11388
CHENG, C. P. N82-11722
CHESTER, R. O. N82-11774
CHHABILDAS, L. C. N82-11200
CHIA, F. I. N82-11016
CHIEN, Y. K. N. N82-11921
CHIU, L. S. N82-11731
CHOE, Y. H. N82-11850
CHOU, Y. T. N82-11315
N82-11498
N82-11499
N82-11500
CHRISTOPHER, P. A. T. N82-11036
N82-11037
N82-11038
CHRISTOPHOROU, L. G. N82-11163
CHU, E. K. N82-11641
CHUM, H. N82-11563
CHUM, H. I. N82-11572
CHUNG, P. M. N82-11152
CHUNG, Y. T. N82-11490
CICOLANI, L. N82-11083
CINA, F. S. N82-11069
CIONI, J. L. N82-11551
CISZEK, T. F. N82-11605
CLANCY, S. P. N82-12006
CLARK, J. P. N82-11110
CLARK, K. H. N82-11470
CLARK, R. L. N82-11729
CLAUS, R. O. N82-11121
N82-11123
N82-11124
N82-11125
N82-11126
N82-11127
N82-11128
N82-11129
N82-11130
N82-11131
N82-11132
N82-11133
CLAUSER, J. F. N82-11939
CLELAND, J. G. N82-11273
CLEMENTS, W. N82-11267
CLIFFORD, J. M. N82-11983
CLINE, C. F. N82-11220
CLINE, M. C. N82-11046
COAKLEY, P. N82-11939
COENSGEN, F. H. N82-11939
COHEN, E. N82-11362
COHEN, E. C. N82-11384
COHEN, S. H. N82-11513
COHN, D. R. N82-11948
COHN, H. N82-11709
COHN, S. H. N82-11773
N82-11775
COICO, P. N82-11872
COLE, J. K. N82-11797
COLGROVE, S. G. N82-11650
CONGDON, C. W. N82-11993
CONINE, B. N82-11040
CONNER, M. N82-11914
CONNOLLY, P. L. N82-11875
CONTE, M. N82-11697
COOLEY, K. R. N82-11746
COOMES, C. A. N82-11753
CORNELIUS, D. K. N82-11148
CORRELL, D. L. N82-11939
COSTELLO, T. N82-11638
COTTRELL, M. J. N82-12002
COUCH, L. M. N82-11088
COURVILLE, G. E. N82-11321
COUSTON, M. N82-11029
COUTTS, T. J. N82-11610
COWELL, W. N82-11586
COX, A. N. N82-12005
N82-12006
COX, J. M. N82-11753
CRABTREE, G. W. N82-11970
CRAIG, R. R., JR. N82-11490
CRANE, F. N82-11892
CRANE, J. K. N82-11873
CRANWELL, R. N. N82-11893
CRAWFORD, A. R. N82-11654
CRAWFORD, R. C. N82-12001
CREDEUR, K. R. N82-11817
CRESS, T. S. N82-11637
CRESWICK, F. A. N82-11417
N82-11422
CROMMELYNCK, D. N82-12016
CRONAN, C. S. N82-11648
CRONAUER, D. C. N82-11165
CRONIN, E. N82-11709
CROSLEY, D. R. N82-11226
CRUM, L. A. N82-11863
CUELLO, R. N82-11258
CULBERT, T. P. N82-11514
CULLINGFORD, H. S. N82-11262
CULVER, M. H. N82-11151
CUMMINS, D. N82-11628
CUMMINS, W. F. N82-11939
CUNNINGHAM, S. W. N82-11816
CURRY, J. E. N82-11118
CUSHMAN, R. B. N82-11308
CUTTS, D. N82-11875

D

DAGENHART, J. R. N82-11391
DALESSIO, G. N82-11245
DANIELS, A. N82-11312
DANNEHOLD, T. L. N82-12009
DAUGHERTY, D. P. N82-11273
DAVIDSON, G. N82-11707
DAVIES, B. M. N82-11983
DAVIES, T. J. N82-11919
DAVIS, H. W. N82-11743
DAVIS, J. C. N82-11939
DAVIS, J. I. N82-11460
DAVIS, M. H. N82-11830
DAVIS, M. W., JR. N82-11895
DAVIS, S. H. N82-11390
DAVISON, L. N82-11506
DAY, D. L. N82-11618
DAYAL, R. N82-11669
DEAVER, F. K. N82-11554
DEBOLD, F. C. N82-11730
DECARLO, W. N82-11644
DEGUEST, P. N82-11089
DEHOFF, R. L N82-11087
DELAHOY, A. E. N82-11575
DELGRECO, F. P. N82-11639
DELLARETTI, O. N82-11655
DEMAS, P. N82-11231
DEMPSEY, J. F. N82-11704
DENKHAUS, H. G. N82-11508
DESARO, R. N82-11230
DESROSIERS, R. N82-11563
DEUTSCH, L. J. N82-11287
DHURIA, H. N82-12010
DIAMOND, P. H. N82-11955
N82-11956
DIAS, M. A. N82-11747
DICELLO, J. F. N82-11885
DIDERRICH, G. T. N82-11317
DIEBOLD, J. N82-11563
DIKE, G. N82-11324
DINEEN, R. N82-11742
DIPIPPO, R. N82-11585
DIPPOLITO, D. A. N82-11955
N82-11956
DITTBENNER, G. N82-11374
DODA, K. N82-11976
DODSON, B. W. N82-11115
DORMAN, H. J. N82-11695
DORN, H. C. N82-11166
N82-11167
DORWARD, R. C. N82-11181
DOUGALL, R. S. N82-11419
DOUGLAS, J. G. N82-11193
DOW, T. A. N82-11471
DOWNS, G. S. N82-11309
DOYLE, B. L. N82-11221
N82-11974
DRAKE, R. P. N82-11939
DRAXLER, R. R. N82-11748
DRECHSLER, D. M. N82-11768
DRESHFIELD, R. L. N82-11182
DRESSENDORFER, P. V. N82-11377
DRICKAMER, H. G. N82-11918
DRUGLIS, E. J. N82-11471
DUBOSE, D. A. N82-11176
DUDLEY, V. E. N82-11617
DUEDALL, I. W. N82-11669
DUFFEY, H. N82-11983
DUFFY, J. V. N82-11212
DUNWOODY, W. N82-11428
DUPREE, A. K. N82-12004
DYE, D. H. N82-11970
DYER, P. N. N82-11168
DYNI, J. R. N82-11683

E

EASON, E. D. N82-11576

EBBESMEYER, C. C. N82-11753
EBISUZAKI, W. N82-11731
ECHER, C. J. N82-11220
ECKERMAN, K. F. N82-11774
ECKERT, E. N82-11618
EDDEY, E. E. N82-11801
EDELMANN, P. N82-11540
EDMONDSON, M. N82-11455
EDWARDS, B. E. N82-11615
EICKER, P. J. N82-11576
EIMERL, D. N82-11378
EINHORN, H. J. N82-11843
EINZIGER, R. E. N82-11896
ELIA, G. G. N82-11501
ELLINGSON, W. A. N82-11169
ELLIOTT, G. R. N82-11713
ELLIS, H., JR. N82-11336
ELLIS, K. J. N82-11775
ELLISON, R. D. N82-11416
N82-11422
ELS, H. N82-11767
EMERSON, L. C. N82-11951
EMERY, V. J. N82-11853
ENTINGH, D. J. N82-11626
ERGAS, R. A. N82-11687
ERNEST, J. N82-11145
ERNSTOFF, M. N. N82-11062
ERZBERGER, H. N82-11018
N82-11082
ESHERICK, P. N82-11463
ESTEY, R. S. N82-11435
EVANS, D. L. N82-11509
EVANS, J. N82-11664
N82-11666
EVANS, J. E. N82-11706
EVANS, R. H. N82-11282
N82-11787
EVANS, W. H. N82-11170
EWBANK, M. D. N82-11961
EZZEDDINE, A. N82-11905

F

FADIN, V. P. N82-11180
FAIN, D. E. N82-11409
N82-11441
N82-11442
FAISS, R. O. N82-11801
FAKHR, A. N82-11143
FARMER, E. E. N82-11750
FARNELL, P. L. N82-11227
FASSIHI, M. R. N82-11153
FAUCHER, G. A. N82-11689
FEARNSIDES, J. J. N82-11626
FEHL, D. N82-11953
FEHRENBACH, M. E. N82-11904
FEIEREISEN, W. J. N82-11396
FELDER, C. E. N82-11869
FELDMAM, S. L. N82-11614
FELSKE, K. E. N82-11104
FENVES, S. J. N82-11827
FERGUSON, N. M. N82-11643
FERNELIUS, B. N82-11605
FERRAL, R. L. N82-11530
FERRALL, J. N82-11146
FERRANTE, J. N82-11183
FERRANTE, M. J. N82-11174
FERZIGER, J. H. N82-11393
N82-11394
N82-11395
N82-11396
FICALORA, P. J. N82-11196
FILLIBEN, J. J. N82-11975
FILLO, J. A. N82-11257
FINKELSTEIN, K. N82-11314
FINNEMORE, D. K. N82-11372
FIORENTINO, A. N82-11230
FIORI, C. E. N82-11177
FISCHER, S. K. N82-11415
FISHER, H. N82-11715
FISHER, W. K. N82-11203
FITCH, B. W. N82-11637
FITZGERALD, C. N82-11995
FITZGERALD, R. N82-11337
FIVELAND, W. N82-11148
FLETCHER, J. E. N82-11750
FLOCK, W. L. N82-11340
FLOREY, D. N82-11324
FLOYD, R. A. N82-11814
FOLEY, R. J. N82-11378
FORCE, A. P. N82-11868
FOREMAN, R. P. N82-11626
FOREST, C. A. N82-11162
FORREST, L. N82-11997
FORSBERG, C. A. N82-11689
FORSYTH, E. B. N82-11371
FORTIER, E. P. N82-11469
FOSKETT, W. H. N82-11664
N82-11665
FOURNIER, R. F. N82-11726
FOWLER, J. C. N82-11538
FRADKIN, L. N82-11644
FRAIZE, W. E. N82-11626
FRANCIS, G. N82-11831
FRANCOIS, J. N82-11089
N82-11636
FRANZ, T. N82-11230
FRENCH, R. N. N82-11142
FRIEDENSTEIN, C. D. N82-11990
FRIEDMAN, D. N82-11586
FRIEDMAN, E. N82-11635
FRIEDMAN, J. H. N82-11842
FRIEDMAN, M. N82-11778
FRIEHE, C. A. N82-11739
FRITSCH, F. N. N82-11812
FRITZ, J. N. N82-11971
FROSCHNER, K. N82-11374
FU-XING, Q. N82-11021
FUCHS, V. N82-11935
FUCHS, W. N82-11725
FUHRMANN, M. N82-11669
FUJIMURA, F. S. N82-11923
FULENWIDER, C. K. N82-11614
FULLER, E. L. N82-11150
FULLER, R. N82-11652
N82-11655
FULLER, W. H. N82-11663

G

GABRIELSEN, R. E. N82-11398
GABRIELSON, J. E. N82-11234
GAFFIN, W. O. N82-11467
GAFNI, E. M. N82-11844
GAGGERO, E. D. N82-11989
GAGNEPAIN, J. J. N82-11366
GALE, G. N82-11301
GALES, C. N82-11225
GALLAGER, R. G. N82-11349
GALLAGHER, C. C. N82-11689
GALLAGHER, J. P. N82-11496
GANGWAL, S. K. N82-11661
GANZEN, V. A. N82-11763
GARDNER, D. G. N82-11880
GARG, A. O. N82-11121
GARWIN, E. L. N82-11972
GASSER, M. G. N82-11312
GAU, J. S. N82-11192
GAUDIAN, B. A. N82-11308
GAUTHIER, C. L. N82-11627
GAY, E. C. N82-11996
GAYNOR, J. E. N82-11740
GEIER, W. N82-11486
GEORGE, R. L. N82-11392
GEORGE, T. F. N82-11964
GERMAN, M. D. N82-11502
GERMANI, M. S. N82-11680
GHANDHI, S. K. N82-11959
GILL, F. R. N82-11077
GILL, G. E. N82-11523
GILL, T. N82-11724
GILLETTE, J. L. N82-11573
GILMORE, P. A. N82-11801
GILREATH, M. C. N82-11339
GLARETAS, C. N82-11856
GLATZMAIER, G. A. N82-12018
GLAZMAN, Y. M. N82-11156
GLOWE, D. E. N82-11364
GLYAZER, L. S. N82-11980
GOAD, W. K. N82-11434
GOBRAN, B. D. N82-11153
GOEBEL, D. M. N82-11888
GOFF, P. G. N82-11421
GOGUEN, J. A. N82-11803
GOGUEN, J. D. N82-12012
GOLDBERG, P. M. N82-11242
GOLDMAN, D. N82-11521
GOLDOWSKY, M. N82-11312
GOLDSTEIN, S. A. N82-11908
GOLSHANI, A. N82-11619
GOMEZ, R. N82-11103
GOODWIN, E. J. N82-11378
GOODWIN, J. P. N82-11303
GOODWIN, W. V. N82-11232
GORIELL, S. R. N82-11214
GOULD, G. D. N82-11304
GOULETTE, R. R. N82-11104
GOURDIN, W. H. N82-11220
GRAHAM, D. J. N82-11113
GRAHAM, R. A. N82-11115
GRAIN, C. N82-11484
N82-11485
GRAMS, G. W. N82-11688
GRANT, T. N82-11715
GRAVES, J. R. N82-11109
GRAY, C. E. N82-11649
GRAY, D. N82-11626
GREEN, D. A. N82-11273
N82-11661
GREEN, L. G. N82-11264
GREENBANK, M. N82-11141
GREENHALL, C. A. N82-11297
N82-11298
GREENWALD, A. C. N82-11546
GREGORY, D. C. N82-11874
GREGORY, N. N82-11679
GREINER, D. E. N82-12019
GRIESS, J. C. N82-11894
GRIFFITH, C. G. N82-11737
N82-11738
GRIFFITH, R. W. N82-11575
GRIGSBY, C. N82-11715
GRIMESEY, R. A. N82-11883
GRIMLEY, A. J. N82-11463
GRISAFFE, S. J. N82-11182
GRITTON, D. G. N82-11898
GROSHEV, V. L. N82-11980
GROSSMAN, G. N82-11405
GRUHN, C. R. N82-11161
GUALTIERI, J. N82-11962
GUANG-RONG, Y. N82-11026
GUANG-SHENG, H. N82-11448
GUANG, H. N82-11447
GULKIS, S. N82-11280
GUNYAEV, G. M. N82-11205
GUO-CHUAN, W. N82-11022
GUPTA, J. N82-11635
GURNEY, G. B. N82-11402

H

HABERMANN, R. E. N82-11682
HABIB-AGAHI, H. N82-11549
HAEBIG, J. E. N82-11242
HAGOPIAN, J. H. N82-11484
N82-11485
HAHS, T. S. N82-11915
HAKEN, R. A. N82-11363
HALE, M. A. N82-11848
HALE, S. D. N82-11538
HALL, R. A. N82-11994
HALL, R. B. N82-11457
HALLERMEIER, R. J. N82-11400
HALSEY, J. N82-11245
HAMPEY, J. M. N82-11136
HAMPTON, D. R. N82-11425
HANCK, J. A. N82-11382
N82-11383
HANEY, H. P. N82-11054
HANKINS, J. D. N82-11576
HANQIAN, Y. N82-11448
HARA, K. N82-11495
HARADA, Y. N82-11207
HARDING, A. N82-11984
HARDY, K. R. N82-11513
HARDY, R. W. N82-11608
HARMISON, L. T. N82-11780
HARRIS, B. N82-11462
HARRIS, D. N82-11903
HARRIS, G. E. N82-11176
HARRIS, J. N82-11516
HARRIS, J. C. N82-11484
N82-11485
HARRIS, R. D. N82-11966
HARRIS, S. E. N82-11706
HARRISON, J. W. N82-11656
HARRISON, W. N82-11518

HARROLD, R. T. N82-11381
HART, K. N82-11325
HARTEN, L. P. N82-11933
N82-11935
HARTMANN, B. N82-11758
HARTMANN, U. N82-11079
HARTWIG, E. O. N82-11645
HASHIDURA, H. N82-11976
HASHIMOTO, R. N82-11067
HASSE, K. R. N82-11181
HASTIE, J. W. N82-11173
HATORI, T. N82-11924
HAUDEN, D. N82-11366
HAUPT, S. E. N82-11672
HAWRYLUK, A. M. N82-11899
HAYES, C. J. N82-11330
HAYES, M. J. N82-11484
N82-11485
HAZARD, D. N82-11245
HAZUCHA, M. J. N82-11778
HE, G. N82-11879
HEATON, M. G. N82-11669
HEFFERNAN, D. M. N82-11445
HEFFTER, J. L. N82-11748
HEFT, R. E. N82-11900
HEINRICH, K. F. J. N82-11177
HEINZ, T. F. N82-11967
HELLER, W. G. N82-11711
HELLING, R. K. N82-11154
HELSETH, J. M. N82-11753
HELTON, J. C. N82-11893
HENDERSON, R. F. N82-11651
HENDRON, R. N82-11715
HERBST, M. N82-11943
HEROUX, L. N82-11703
HERRMAN, D. T. N82-11283
HERRMANN, W. N82-11854
HICKS, R. M. N82-11054
HIGG, D. W. N82-11942
HILL, R. W. N82-11248
HILLS, F. J. N82-11175
HINCHEY, L. R. N82-11753
HIRANO, K. N82-11929
HIVELY, L. M. N82-11948
HLUCKYJ, M. G. N82-11349
HO, P. N82-11140
HO, P. S. N82-11973
HOBBS, L. W. N82-11375
HOBBY, G. L. N82-11095
HOCHMUTH, J. N82-11545
HOCKER, L. N82-11919
HODGES, L. N82-11581
HODGSON, T. H. N82-11039
HODSON, S. W. N82-12006
HOFFLER, G. W. N82-11770
HOFFMAN, H. W. N82-11640
HOGARTH, R. M. N82-11843
HOGEN, D. J. N82-11792
HOHENEMSER, K. H. N82-11045
HOLDAHL, S. R. N82-11744
HOLDREN, J. P. N82-11646
HOLIAN, B. L. N82-11971
HOLIHAN, R. G., JR. N82-11401
HOLLAND, L. R. N82-11094
HOLLERAN, T. P. N82-11222
HOLLOWAY, R. W. N82-11898
HOLMES, J. A. N82-11948
HOLMES, J. T. N82-11556
N82-11604
HONG-KUN, X. N82-11027
HOOGENBOOM, L. N82-11466
HOOPER, E. B., JR. N82-11939
HOOVER, R. B. N82-11432
HOPKINS, B. N82-11919
HORNSY, G. M. N82-11390
HOSTETLER, L. D. N82-11576
HOUCK, R. T. N82-11538
HOULBERG, W. A. N82-11948
HOUSEMAN, J. N82-11146
HOUTMAN, B. H. N82-11727
HOVEY, P. W. N82-11496
HOWARTH, G. L. N82-11353
HOWE, H. C. N82-11948
N82-11950
HOYER, E. N82-11878
HRABAK, R. A. N82-11317
HSIAO, D. K. N82-11790
HSIU, C. C. N82-11017
HU, J. M. N82-12024
HUANG, T. N82-11326
HUB, K. N82-11573
N82-11579
HUBER, A. L. N82-11750
HUDSON, J. W. N82-11307
HUGHES, A. N82-11724
HUGHES, S. M. N82-11793
HUGHES, T. P. N82-11865
HULETT, L. D. N82-11643
HULL, L. N82-11521
HUNN, B. D. N82-11600
HUNTER, P. E. N82-11788
HUNTER, R. O. N82-11373
HURD, J. L. N82-11605
HURLBUT, F. C. N82-11872
HURSTA, W. N. N82-11770
HUSSON, T. R. N82-11787
HWANG, D. N82-11536
HWANG, D. P. N82-11043

I

I, L. N82-11864
IANNUCCI, J. J. N82-11576
ICHIKAWA, T. N82-11035
ICHIKAWA, Y. N82-11501
IDA, T. N82-11976
IGONIN, D. A. N82-11763
ILYUSHCHENKO, V. I. N82-11852
IMEL, G. R. N82-11941
IMMERMAN, W. N82-11892
INGHAM, J. D. N82-11634
INOUE, A. N82-11925
IRELAND, P. J. N82-11597
N82-11610
IRISH, J. D. N82-11751
ISAACSON, R. N82-11244
ISHII, K. N82-11323
ITIKAWA, Y. N82-11927
ITOH, K. N82-11926
ITOH, S. I. N82-11926
IWAMA, N. N82-11925

J

JACKSON, E. B. N82-11307
JACOBS, P. P. N82-11402
JAFFE, L. D. N82-11550
JAKOBSEN, R. J. N82-11471
JAMART, B. M. N82-11754
JAMES, E. N82-11264
JAMIESON, A. N82-11664
JANKA, K. N82-11978
JAO, C. S. N82-11199
JARDINE, L. J. N82-11890
JARRELL, D. K. N82-11943
JARVI, D. W. N82-11781
JEFFERS, E. L. N82-11991
N82-11992
JEFFREY, E. N. N82-11367
JEFFREY, F. N82-11609
JEFFRIES, R. A. N82-11472
JIAN-ZHONG, X. N82-11025
JIN-LIANG, J. N82-11015
JIN-SHENG, Y. N82-11025
JOBSON, H. E. N82-11543
JOHANSSON, E. S. N82-11063
JOHNS, M. V., JR. N82-11483
JOHNSON, B. M. N82-11874
JOHNSON, D. C. N82-11993
JOHNSON, D. J. N82-11953
JOHNSON, M. M. N82-11554
JOHNSON, R. E. N82-11838
JOHNSON, W. L. N82-11873
JOHNSTON, L. C. N82-11462
JONES, I. W. N82-11493
JONES, K. W. N82-11874
JONES, P. B. N82-12011
JONES, R. W. N82-11601
JONES, S. C. N82-11549
JONES, W. R., JR. N82-11211
JONG, B. W. N82-11333
JORDAN, C. W. N82-11873
JOU, W. H. N82-11041
JUDD, J. L. N82-11942
JUNKIN, P. D. N82-11657

K

KABUZENKO, S. N. N82-11179
KAGAN, D. T. N82-11968
KALMAN, G. N82-11870
KALMAN, M. D. N82-11418
KALTER, R. J. N82-11275
KALUZA, J. N82-11725
KALVINSKAS, J. N82-11145
KALVINSKAS, J. J. N82-11634
KAMERMAN, G. W. N82-11937
KAN, J. R. N82-11699
KANE, S. N82-11535
KANG, K. N82-11839
KANNEL, J. W. N82-11471
KANT, P. N82-11073
KANTER, E. P. N82-11881
KANTROWITZ, M. N82-11325
KARISH, C. R. N82-11716
KARMARKER, J. N82-11048
KASUDA, T. N82-11319
N82-11323
KATZ, B. S. N82-11730
KATZ, J. N82-11288
KAWAHATA, K. N82-11925
KAWAOKA, K. N82-11245
KAZMERSKI, L. L. N82-11597
N82-11605
N82-11610
KE-XIANG, W. N82-11026
KECK, D. B. N82-11913
KEEFE, D. N82-11878
KELLY, K. C. N82-11284
KEMME, J. E. N82-11427
KEMPEN, H. V. N82-11361
KENDALL-TOBIAS, M. N82-11607
KENNEDY, P. J. N82-11739
KEPPLER, H. N82-11715
KERR, R. M. N82-11386
KESTIN, J. N82-11585
KETOFF, A. N82-11592
KETTERSON, J. B. N82-11970
KEYSER, D. N82-11721
KIM, K. S. N82-11494
KINDLE, C. H. N82-11149
KING, R. W. P. N82-11342
KING, W. J. N82-11656
KINGSBURY, D. L. N82-11912
KINNEY, L. N82-11324
KIPP, M. E. N82-11266
N82-11506
KIRBY, R. E. N82-11972
KIRCHHOFF, W. K. N82-11677
KISSEL, F. J. N82-11101
KLEEMAN, P. I. N82-11589
KLEIN, D. N. N82-11603
KLEIN, M. N82-11280
KLEIN, M. M. N82-11702
KLEMETTI, W. I. N82-11344
KLIENBERG, L. N82-11359
KLONIAS, V. K. N82-11836
N82-11837
KNAUSS, W. G. N82-11494
KNIGHT, F. N82-11978
KNIGHT, F. K. N82-12000
KOBAK, J. A. N82-11397
KOCISOVA, J. N82-11759
KOGUT, J. N82-11512
KOHLMAN, D. L. N82-11052
KOKONINA, M. R. N82-11980
KOLBA, V. M. N82-11996
KOLESAR, E. S., JR. N82-11229
KOLODNY, G. M. N82-11776
KOMOLOVA, G. S. N82-11757
KOO, J. Y. N82-11192
KORBEL, G. R. N82-11873
KORNILOVA, L. N. N82-11764
KORRELL, J. A. N82-11740
KOSTETSKIY, I. I. N82-11185
KOSZYKOWSKI, R. F. N82-11900
KOUROUKLIS, G. A. N82-11163
KRAMER, M. J. N82-11503
KRATZER, M. N82-11892
KREBS, V. N82-11079
KRENIK, R. M. N82-11873
KRILL, W. V. N82-11641
KRISHMAN, R. P. N82-11151
KRUESI, E. N82-11806
KUBO, L. H. N82-11997
KUDRYASHOV, B. A. N82-11760

KUIPER, T. N82-11280
KULIN, S. A. N82-11135
KUMAR, A. N82-11032
KUMAR, S. N82-11789
KUMAR, V. N82-11502
KUMER, J. B. N82-11706
KUO, C. P. N82-11098
KURLAND, R. M. N82-11116
KURTZ, J. N82-11325
KUSHLIN, V. I. N82-11980
KUSWA, G. W. N82-11953
KWAN, T. J. T. N82-11461
KWOK, T. N82-11973

L

LABIAK, W. G. N82-11810
LADANY, I. N82-11452
LAGER, D. L. N82-11505
LAHEY, R. T., JR. N82-11876
LAIRD, B. N82-11119
LAKHTIN, G. A. N82-11980
LAKSHMINARAYANA, B. N82-11031
LALIBERTE, B. R. N82-11213
LANDER, H. R. N82-11228
LANDRUM, E. T., JR. N82-11786
LANGELIERS, J. N82-11618
LANGLAND, R. T. N82-11712
LANGLEY, D. S. N82-11912
LANIER, J. R., JR. N82-11109
LANSING, F. L. N82-11310
LAPE, J. S. N82-11808
LARBALESTIER, D. C. N82-11954
LARSON, L. R. N82-11531
LAUB, R. J. N82-11114
LAUFER, M. V. N82-11335
LAUGHLIN, C. P. N82-11529
LAW, K. H. N82-11827
LAY, R. K. N82-11626
LEBEDEV, V. G. N82-11980
LEBLANC, E. J. N82-11705
LEBOT, Y. N82-11089
LEE, A. A. N82-11271
LEE, E. N82-11264
LEE, H. M. N82-11342
LEE, J. H. N82-11096
LEE, J. J. N82-11752
LEE, R. N82-11374
LEE, X. S. N82-11955
N82-11956
LEE, Y. T. N82-11879
LEEPER, R. J. N82-11953
LEFFEL, C. S., JR. N82-11535
LEI, W. C. N82-11017
LEIGH, J. G. N82-11626
LEMONS, D. S. N82-11884
LENDER, H. N82-11582
LENHART, S. M. N82-11822
LESCHACK, A. R. N82-11711
LETTS, S. A. N82-11873
LEUPOLD, R. C. N82-11513
LEVIN, E. R. N82-11452
LEVY, A. N82-11324
LEYENDECKER, H. N82-11080
LI, H. Y. N82-12024
LI, W. X. N82-12026
LICHTMAN, A. H. N82-11769
LIEN, T. N82-11800
LIN-KUI, X. N82-11021
LIN, C. Y. N82-11284
LIN, E. N82-11658
LIN, H. B. N82-11160
LIN, R. Y. N82-11929
LIN, S. C. N82-11208
LINDGREN, R. N82-11897
LING, F. F. N82-11211
LINK, L. E., JR. N82-11910
LINNERUD, H. J. N82-11492
LIPES, R. N82-11295
LIPES, R. G. N82-11287
LIPSCOMB, W. O. N82-11642
LITTLEJOHN, L. L. N82-11823
LIU, H. N82-11375
LIU, Y. M. N82-11975
LIVINGSTON, J. M. N82-11688
LIVINGSTON, R. K. N82-11667
LO, Y. T. N82-11343
LOKEN, S. C. N82-11877
LOLLAR, L. F. N82-11109
LOO, B. W. N82-11474
LOONEY, L. N82-11919
LORD, R. E. N82-11789
LU, C. N82-12025
LU, L. W. N82-11326
LUNDBERG, L. N82-11428
LUNDY, A. S. N82-11066
LUTHER, F. M. N82-11647
LVOV, S. N. N82-11185
LYMAN, W. J. N82-11485
LYNCH, F. E. N82-11155
LYNCH, M. F. N82-11984
LYNNWORTH, L. C. N82-11063
LYON, J. F. N82-11948
LYON, W. S. N82-11643
LYONS, P. B. N82-11919
LYTTON, M. N82-11626

M

MACAUSLAN, J. M. N82-12008
MACHNIK, D. E. N82-11999
MACKUS, C. N82-11658
MACLENNAN, B. J. N82-11805
N82-11809
MACLER, B. A. N82-11256
MACPHERSON, R. W. N82-11456
MAEDER, P. F. N82-11585
MAGEE, C. W. N82-11452
MAHAN, H. N82-11609
MAHER, W. E. N82-11457
MAKEYEVA, V. F. N82-11757
MAKHOUL, J. N82-11345
MAKOWITZ, H. N82-11903
MALEK, H. N82-11289
MANGOLDS, A. N82-11516
MANHARDT, P. D. N82-11055
MANNI, M. A. N82-11897
MANNING, J. R. N82-11214
MANNY, E. H. N82-11654
MANSFIELD, D. K. N82-11462
MARCANIK, J. N82-11759
MAREK, M. N82-11497
MARG, N. M. N82-11693
MARGOLIN, L. G. N82-11408
MARR, W. N82-11579
MARSTON, P. L. N82-11912
MARTIN, H. N82-11306
MARTIN, R. L. N82-11902
MARTIN, T. H. N82-11908
MARTINEZ, R. N82-11071
MARTINO, F. J. N82-11578
MASAITIS, C. N82-11831
MASLAKOVA, T. M. N82-11186
MASLENKOV, S. B. N82-11179
MASSEY, R. N82-11356
MATHERS, C. D. N82-11855
MATSON, J. E. N82-11063
MATSUNO, K. N82-11826
MATSUSUE, K. N82-11067
MATSUZAKI, Y. N82-11034
MATTHEI, K. W. N82-11546
MATTHEWS, D. L. N82-11943
MATTIS, R. L. N82-11975
MATTOX, D. M. N82-11951
MATTOX, R. M. N82-11784
MAUEL, M. E. N82-11906
MAULDIN, G. H. N82-11591
MAURER, W. N82-11954
MAXON, S. N82-11940
MAY, R. P. N82-11193
MAYER, F. J. N82-11943
MAYER, G. B., JR. N82-11091
MAYNARD, D. P. N82-11516
MAZOR, S. D. N82-11994
MAZZOLAI, F. M. N82-11198
MCBEE, W. C. N82-11333
MCBETH, R. B. N82-11736
MCBREEN, J. N82-11368
N82-11582
MCCALL, G. H. N82-11944
MCCARTHY, J. N82-11146
MCCLUSKEY, J. T. N82-11280
N82-11309
MCCOMB, H. G., JR. N82-11489
MCCOY, H. E. N82-11894
MCCUNE, R. A. N82-11174
MCELIECE, R. J. N82-11290
N82-11291
MCFARLAND, R. D. N82-11601
MCGHEE, R. J. N82-11033
MCGINNESS, H. N82-11301
MCGRATH, W. R. N82-11361
MCGUIRE, D. N82-11914
MCHARG, B. B. N82-11813
MCHENRY, J. N. N82-11672
MCKEEN, R. G. N82-11313
MCKENZIE, M. N82-11284
MCKEOWN, M. N82-11897
MCLARNON, F. N82-11594
MCLAUGHLIN, K. R. N82-11750
MCMAHON, T. N82-11609
MCMAHON, W. J. N82-11703
MCMICHAEL, W. J. N82-11273
N82-11661
MCMILLAN, P. F. N82-11138
MCMULLEN, J. W. N82-11262
MCNEIL, J. A. N82-11294
MCNEIL, R. I. N82-11165
MCNUTT, L. N82-11537
MCRAE, G. J. N82-11629
MEAKIN, J. D. N82-11553
MEANS, J. L. N82-11631
MEEHL, G. A. N82-11736
MEI, K. K. N82-11347
MEIER, R. L. N82-11995
MEINDERS, M. N82-11466
MELIA, M. N82-11679
MENDEL, C. W., JR. N82-11953
MENON, M. J. N82-11790
MENYUK, C. R. N82-11385
MERCERET, F. J. N82-11743
MERRICK, R. H. N82-11424
MERRIGAN, M. N82-11428
MERRITT, B. T. N82-11898
MESEGUER, J. N82-11803
METZ, P. D. N82-11412
MEURMAN, A. E. N82-11821
MEURZEC, J. P. N82-11029
MEYER, G. N82-11083
MEYERS, S. N82-11592
MEZZINA, A. N82-11414
MICHARD, J. N82-11089
MICHEL, J. W. N82-11587
MIKKELSEN, K. N82-11374
MILES, J. N82-11611
MILEY, G. H. N82-11903
MILLARD, G. C. N82-11649
MILLARD, G. H. N82-11334
MILLER, A. N82-11103
MILLER, A. K. N82-11896
MILLER, C. W. N82-11608
MILLER, D. R. N82-11555
MILLER, M. D. N82-11453
MILLER, P. A. N82-11953
MILLER, R. L. N82-11287
MILLER, W. A. N82-11416
MILLER, W. E. N82-11996
MILLS, H. E. N82-11107
MILMAN, A. S. N82-11338
MILNE, T. N82-11563
MILSHTEIN, S. N82-11960
MILSTEIN, J. B. N82-11608
MINNUCCI, J. A. N82-11546
MINOR, E. G. N82-11810
MISSAL, D. W. N82-11560
MITCHELL, D. W. N82-11782
N82-11783
MITCHELL, S. O. N82-11493
MITCHELL, T. E. N82-11375
MIXON, F. O. N82-11273
N82-11661
MOFFETT, L. H. N82-11787
MOLCHANOV, V. F. N82-11389
MONINGER, W. R. N82-11742
MONJES, J. A. N82-11916
MONK, M. W. N82-11092
MONTGOMERY, D. N82-11946
MONTGOMERY, M. D. N82-11945
MOOKHERJI, T. K. N82-11544
MOON, F. C. N82-11481
N82-11495
N82-11851
MOORE, A. R. N82-11557
N82-11558
MOORE, W. M. N82-11475
MOREHOUSE, J. H. N82-11407
MORELLI, A. N82-11911
MORICZ, F. N82-11828

MORJARIA, M. A. N82-11481
MORLEY, B. M. N82-11688
MORRIS, C. E. N82-11971
MORRIS, C. E. K., JR. N82-11050
MORRIS, J. F. N82-11399
MOSTOW, D. J. N82-11802
MOYNIHAN, P. I. N82-11144
MUELLER, W. A. N82-11634
MUKAI, T. N82-11375
MUKHERJEE, S. N82-11481
MULLEN, W. G. N82-11329
MULLENDORE, A. W. N82-11951
MURPHY, H. N82-11715
MURPHY, L. M. N82-11606
MURPHY, W. C. N82-11964
MURRAY, D. P. N82-11523
MURRI, D. G. N82-11013
MURTHY, M. V. V. N82-11488
MYERS, R. H. N82-11833
N82-11834
MYERS, S. M. N82-11201
MYKLEBUST, R. L. N82-11177
MYRA, J. R. N82-11955
N82-11956

N

NADILE, R. M. N82-11706
NAIGENG, S. N82-11451
NAKAGAWA, A. N82-11192
NAKASHIMA, M. N82-11326
NAVATO, A. N82-11731
NEAL, J. T. N82-11714
NECE, R. E. N82-11660
NEIGHBORGALL, R. N82-11356
NEKOKSA, G. N82-11382
N82-11383
NELKEN, L. H. N82-11484
N82-11485
NELSON, G. L. N82-11532
NELSON, M. A. N82-11919
NESSETT, D. M. N82-11818
NEUMAN, F. N82-11018
NEVAREZ, R. E. N82-11285
NEWBURY, D. E. N82-11177
NEWELL, R. E. N82-11731
NEWMAN, P. R. N82-11961
NGUYEN, T. H. N82-11063
NGUYEN, V. V. N82-11588
NIBLEY, D. N82-11991
N82-11992
NICHOLS, B. E. N82-11622
NICHOLS, D. B. N82-11457
NICKERSON, E. C. N82-11747
NIELDSEN, P. D. N82-11940
NIELSON, C. E. N82-11465
N82-11468
NIEVES, A. L. N82-11320
NISHIKAWA, K. N82-11924
NOLA, F. J. N82-11360
NOLT, I. G. N82-11698
N82-11747
NONZIATO, J. W. N82-11266
NOOR, A. K. N82-11489
NORTHCUTT, K. J. N82-11643
NOTTENBURG, R. N82-11610
NUGENT, T. N82-11477
NUSS, R. H. N82-11991
N82-11992
NUTTALL, R. L. N82-11170
NYE, R. A. N82-11155

O

OBERJOHN, W. J. N82-11148
OBLOW, E. M. N82-11949
OCHELTREE, S. L. N82-11126
OCHOA, A., JR. N82-11377
OCHS, T. N82-11618
ODONNELL, T. J. N82-11811
OEN, O. S. N82-11886
OGDEN, J. M. N82-11955
N82-11956
OGLE, J. W. N82-11919
OHNUMA, T. N82-11928
OHR, S. Y. N82-11774
OHYAMA, T. N82-11927
OICLES, J. A. N82-11898
OKA, M. N82-11976
OKAMOTO, M. N82-11929
OKECH, B. N82-11652
OLESEN, T. N82-11665
OLKEN, F. N82-11795
OLNESS, D. U. N82-11267
OLSEN, A. R. N82-11320
OLSEN, C. W. N82-11504
OLSON, A. J. N82-11811
OLSON, D. B. N82-11164
OLVER, A. D. N82-11292
OMURA, J. K. N82-11341
ONEAL, B. L. N82-11649
OPPENHEIM, A. K. N82-11872
ORANGE, L. N82-11107
ORCHIN, M. N82-11236
ORHAM, E. L. N82-11219
ORZECHOWSKI, J. A. N82-11055
OSTERYOUNG, R. A. N82-11572
OTOSHI, T. Y. N82-11300
OTTO, N. C. N82-11578

P

PADDISON, F. C. N82-11535
PANGERI, S. F. N82-11628
PARKER, J. V. N82-11945
PARKER, V. B. N82-11170
PARKS, J. H. N82-11458
PARKS, R. E. N82-11917
PARTCH, E. N. N82-11755
PASCUCCI, M. N82-11375
PATER, R. H. N82-11117
PATRINOS, A. A. N. N82-11640
PATTERSON, E. W. N82-11688
PATTERSON, W. J. N82-11118
PEARCE, E. N82-11208
PEARCE, H. T. N82-11327
PEARSALL, N. M. N82-11610
PEARSON, C. N82-11715
PEDERSEN, N. E. N82-11063
PEKRUL, P. J. N82-11507
PENG, Y. K. M. N82-11948
PENNISE, S. N82-11507
PENSE, A. W. N82-11202
PEREZ-BLANCO, H. N82-11405
PEREZ-ESANDI, J. J. N82-11730
PEREZ-GRIFFO, M. L. N82-11876
PEREZ, J. M. N82-11175
PERKINS, W. G. N82-11241
PERNG, S. N82-11724
PERREIRA, J. N82-11991
N82-11992
PERROUD, P. N82-11225
PERRY, F. C. N82-11952
N82-11953
PERRY, R. M. N82-12017
PERRY, W. O. N82-11365
PESSAGNO, S. N82-11641
PETER, W. N82-11158
PETERS, D. A. N82-11045
PETERSON, D. W. N82-12007
PETERSON, R. N82-11872
PETROV, A. V. N82-11030
PETROV, V. K. N82-11980
PETTY, S. M. N82-11293
N82-11294
PFEFFERKORN, C. N82-11614
PFEIFFER, J. N82-11244
PHILLION, D. W. N82-11938
PHILLIPS, W. J. N82-11686
PHINNEY, W. C. N82-11691
PICKER, J. E. N82-11139
PIERANTOZZI, R. N82-11168
PIERI, R. V. N82-11689
PIMMELL, R. L. N82-11778
PINDER, G. F. N82-11588
PINES, S. N82-11070
PING-CHENG, W. N82-11017
PINKUS, O. N82-11429
PIROGOV, S. V. N82-11980
PLANTE, E. R. N82-11173
PLATO, G. J. N82-11977
PLAWSKY, J. L. N82-11154
PLESKOT, L. K. N82-12014
POEL, J. D. N82-11991
N82-11992
POON, P. T. N82-11550
POSNER, E. C. N82-11286
POTTER, R. N82-11715
POULOS, H. G. N82-11331
POWELL, G. L. N82-11150
POWELL, J. R. N82-11257
POWELL, R. W. N82-11191
PRAEL, R. E. N82-11885
PRAGAR, M. N82-11178
PRATHER, D. D. N82-11346
PRENGER, F. C., JR. N82-11426
N82-11427
PRETO, S. K. N82-11578
PRICE, C. F. N82-11086
PROBER, D. N82-11361
PUGH, T. N82-11554

Q

QING-FAN, Z. N82-11028
QUINTENZ, J. P. N82-11953

R

RABEN, J. D. N82-11523
RADATZ, J. W. N82-11804
RADOSTITZ, J. V. N82-11698
RAINEY, K. D. N82-11978
RAM, A. N82-11933
RAMEY, G. E. N82-11369
RAMEY, H. J., JR. N82-11153
RANADIVE, A. Y. N82-11217
RASMUSSEN, J. E. N82-11344
RASMUSSEN, W. T. N82-11772
RAVNER, H. N82-11472
RAYMOND, E. T. N82-11072
REAGAN, J. R. N82-11184
REBENTISCH, S. D. N82-11846
RECHARD, P. A. N82-11443
RECHSTEINER, C. E., JR. N82-11484
N82-11485
RECTOR, J. N82-11750
REDDY, A. S. S. R. N82-11100
REED, R. K. N82-11745
REED, T. B. N82-11563
REINHART, G. W. N82-11986
REINMANN, J. J. N82-11053
REINOVSKY, R. E. N82-11379
RENZETTI, N. A. N82-11279
RESTORFF, K. A. N82-11788
REYNOLDS, W. C. N82-11393
N82-11394
N82-11396
RHEE, J. N82-11660
RHODES, C. M. N82-11432
RHODES, P. H. N82-11147
RICE, C. K. N82-11415
RICE, M. P. N82-11625
RICH, L. G. N82-11668
RICHARD, D. N82-11967
RICHARDS, P. L. N82-11361
RICHARDS, W. F. N82-11343
RICHEY, E. P. N82-11660
RICHMOND, C. R. N82-11157
RIEBER, M. N82-11652
N82-11653
N82-11655
RIEPE, K. B. N82-11945
RIHAL, S. S. N82-11328
RIPIN, B. N82-11943
RIPOLL, R. P. N82-11989
ROBERTS, G. A. N82-11362
ROBERTS, J. C. N82-11211
ROBINSON, C. W. N82-11072
ROBINSON, G. Y. N82-11965
ROBINSON, J. N. N82-11322
ROCHE, J. C. N82-11106
ROCHE, J. M. N82-11983
ROCHE, M. F. N82-11578
ROCHEFORT, J. S. N82-11438
ROCK, S. M. N82-11087
ROCKOWER, E. B. N82-11460
RODEMICH, E. R. N82-11291
RODER, A. N82-11972
RODRIGUESDEMIRANDA, W. R. N82-11365
ROELOFS, T. H. N82-11700
ROESSNER, J. D. N82-11623
ROGERS, L. K. N82-11513
ROGERS, R. T. N82-11121
ROGERS, S. P. N82-11517

ROGERS, W. E. N82-11625
ROGES, R. T. N82-11129
ROHATGI, N. N82-11145
ROHWEIN, G. J. N82-11370
ROLLBUHLER, R. J. N82-11397
ROQUE, D. N82-11838
ROSE, J. H. N82-11183
ROSEN, R. D. N82-11690
ROSENBLAT, S. N82-11390
ROSS, L. E. N82-11578
ROUFOSSE, M. C. N82-11696
ROUKOS, S. N82-11345
ROY, D. M. N82-11222
ROY, R. N82-11222
RU-QUN, Y. N82-11024
RUBERTO, R. G. N82-11165
RUBIN, A. N82-11295
RUBIN, A. G. N82-11108
RUCK, H. M. N82-11969
RUPICH, M. W. N82-11552
RUSSELL, C. T. N82-11105
RUSSELL, P. B. N82-11688
RUTES, O. V. N82-11179
RUTHBER, S. N82-11384
RUTHERFORD, P. H. N82-11948
RYUMIN, S. M. N82-11980

S

SABEY, J. D. N82-11425
SABISKY, E. N82-11609
SABLATASH, M. N82-11337
SACKS, S. N82-11324
SAENGER, K. L. N82-11867
SAKAI, K. N82-11925
SALSTEIN, D. A. N82-11690
SALTUS, R. W. N82-11716
SANDERSON, W. G. N82-11406
SANDESARA, N. B. N82-11970
SANTHANAM, P. N82-11361
SANTORO, R. T. N82-11949
SANUKI, H. N82-11928
SARIKAYA, M. N82-11195
SARJEANT, W. J. N82-11591
SATO, M. N82-11925
SATYAVRATAN, P. N82-11272
SAVELL, F. J. N82-11911
SCALF, K. N82-11679
SCHAEFER, R. J. N82-11214
SCHAFFER, J. N82-11101
SCHAPIRO, N. N82-11523
SCHIETZELT, M. N82-11605
SCHILLER, S. N82-11593
SCHILT, F. S. N82-11685
SCHIPPER, L. N82-11592
SCHLATTER, E. C. N82-11774
SCHLICHTING, J. N82-11120
SCHLINKER, R. H. N82-11859
SCHMEISER, B. N82-11839
SCHMIDT, G. F. N82-11547
SCHMIDT, L. J. N82-11750
SCHMIDT, R. A. N82-11789
SCHMITT, R. N82-11223
SCHNEIDER, J. W. N82-11137
SCHNIPKE, R. J. N82-11148
SCHROEDER, M. A. N82-11226
SCHROEDER, R. J. N82-11943
SCHROETER, J. N82-11767
SCHUETZLE, D. N82-11175
SCHUMM, R. H. N82-11170
SCHWARTZ, R. N82-11345
SCHWEE, L. J. N82-11788
SCOGGINS, R. K. N82-11910
SCOTT, A. J. N82-11942
SCOTTI, N. N82-11708
SEAMAN, C. H. N82-11435
SEARLS, C. A. N82-11430
SEARS, R. D. N82-11706
SEETOO, W. R. N82-11562
SEIBERT, M. N82-11607
SEIDEL, D. B. N82-11953
SEIDMAN, T. I. N82-11829
SELBY, T. W. N82-11409
SELK, R. N82-11919
SELKIRK, H. B. N82-11731
SERFLING, R. J. N82-11835
SEROVA, L. V. N82-11757
SETCHELL, R. E. N82-11266
SFORZA, P. M. N82-11158
SHAFFER, R. D. N82-11280
N82-11281
N82-11309
SHAFFT, H. A. N82-11384
SHAH, M. C. N82-11672
SHAMASUNDAR, B. I. N82-11904
SHANNON, M. J. N82-11248
SHAOXIAN, M. N82-11451
SHAPIRO, F. B. N82-11760
SHAPIRO, M. A. N82-11739
SHARMAN, R. D. N82-11387
SHARP, E. G. N82-11626
SHAW, C. T. N82-11038
SHEEHY, J. W. N82-11673
SHEFFIELD, R. L. N82-11945
SHELLEY, K. H. N82-11815
SHELPUK, B. N82-11611
SHEN, Y. R. N82-11967
SHENG, Y. T. N82-11016
SHENTON, L. R. N82-11841
SHEPARD, W. S. N82-11934
SHEPHARD, M. T. N82-11788
SHEPPARD, S. B. N82-11806
SHERMA, J. N82-11171
SHERMAN, A. N82-11312
SHI-CAN, Z. N82-11015
SHIH, C. F. N82-11502
SHIMA, Y. N82-11870
SHIMIZU, K. N82-11929
SHIMOTAKE, H. N82-11996
SHIRANI, E. N82-11394
SHOUCRI, M. M. N82-11935
SHREVE, P. H. N82-11365
SHU, J. N82-12024
SIERADZKI, K. N82-11196
SILBEREIS, F. J. N82-11957
SILVA, J. H. N82-11362
SIMMONS, R. D. N82-11919
SIMMONS, T. N. N82-11649
SIMMS, R. J. N82-11936
SIMON, M. K. N82-11341
SIMON, P. S. N82-11343
SINGER, I. L. N82-11472
SINGER, S. N82-11373
SIOMOS, K. N82-11163
SIRPILLA, R. L. N82-11302
SITT, B. N82-11459
SIVASANKARA, S. A. N82-11847
SKARDA, R. N82-11759
SKEHAN, J. W. N82-11519
N82-11523
SKELTON, R. E. N82-11081
SKIBA, P. N82-11521
SKILLERN, C. R. N82-11271
SLOBODNIK, A. J., JR. N82-11362
SMALLWOOD, M. D. N82-11513
SMITH, A. D. N82-11361
SMITH, D. L. N82-11379
SMITH, H. M. N82-11660
SMITH, J. R. N82-11183
SMITH, M. N82-11679
SMITH, R. D. N82-11873
SMITH, R. T. N82-11452
SMITH, R. W. N82-11557
N82-11558
SMITH, W. W. N82-11110
N82-11111
SMOKLER, P. E. N82-11633
SMORTO, M. N82-11158
SMULLIN, L. D. N82-11905
SMYRL, N. R. N82-11150
SNOW, G. C. N82-11641
SNOW, W. L. N82-11434
SNOWDEN, R. N82-11554
SNYDER, D. B. N82-11716
SOLOMON, A. D. N82-11410
SOLOMON, F. W. N82-11820
SOMS, A. P. N82-11482
SONG, C. J. N82-12023
SONG, S. S. N82-11840
SONGHAO, L. N82-11447
N82-11448
SPAHR, N. E. N82-11734
SPENCER, S. N82-11521
SPLAINE, J. N82-11911
SQUYRES, S. W. N82-12013
SRINVASAN, S. N82-11582
ST.CLAIR, A. K. N82-11206
ST.CLAIR, T. L. N82-11206
STABEKIS, P. D. N82-11095
STAINKEN, D. N82-11178
STAPLES, B. R. N82-11172
STASKUS, J. V. N82-11106
STAUBER, M. N82-11903
STEINBERG, M. N82-11257
STEINDLER, M. J. N82-11890
STEINMEYER, D. A. N82-11564
STEINVALL, O. N82-11758
STENGEL, K. C. N82-11756
STEPHENS, K. N82-11245
STEVENS, I. N82-11772
STEVENS, N. J. N82-11107
STIGER, R. R. N82-11265
STILES, H. N82-11510
STOCKEMER, F. J. N82-11224
STOCKWELL, R. D. N82-11471
STOJANOFF, C. G. N82-11618
STOLOFF, N. S. N82-11187
STONE, G. F. N82-11899
STONE, J. N82-11609
STONEHART, P. N82-11545
STOUT, R. D. N82-11202
STROGH, V. G. N82-11335
STRONG, S. J. N82-11622
STRONGIN, O. N82-11522
STUDER, P. A. N82-11312
STUETZLE, W. N82-11842
SUBELMAN, E. J. N82-11296
SUGIHARA, T. N82-11632
SUH, P. N82-11903
SUHR, G. N82-11715
SUKYS, R. N82-11438
SULLIVAN, L. K. N82-11092
SULLIVAN, T. A. N82-11333
SUNG, C. C. N82-11016
SUREK, T. N82-11608
SURLES, T. N82-11644
SVIATOSLAVSKY, I. N. N82-11954
SWAN, P. A. N82-11990
SWEENEY, M. A. N82-11952
SWENSON, P. N82-11423
SWIFT, A. H. P. N82-11045
SZABO, T. L. N82-11362

T

TABACK, I. N82-11431
TAKAHARA, K. N82-11067
TALBOT, J. B. N82-11907
TANG, W. M. N82-11955
N82-11956
TANGE, T. N82-11924
TANNER, L. E. N82-11220
TARN, W. N82-11963
TAYLOR, F. R. N82-11227
TAYLOR, L. T. N82-11166
N82-11167
N82-11206
TEAGAN, W. P. N82-11421
TERASHIMA, Y. N82-11926
THIEBERGER, P. N82-11897
THIEME, L. G. N82-11993
THOM, E. H. N82-11300
THOMAS, G. N82-11192
THOMASSON, J. F. N82-11116
THORNTON, J. A. N82-11553
THURBER, W. R. N82-11975
TIBBALS, C. H. N82-11529
TILLMAN, J. E. N82-11535
TIPTON, D. G. N82-11190
TIPTON, L. M. N82-11274
N82-11657
TONG-JI, L. N82-11020
TONG, H. N82-11641
TOODLE, D. E. N82-11454
TOPILIN, V. V. N82-11179
TREASTER, A. L. N82-11402
TRENHOLME, J. N82-11378
TRENT, B. C. N82-11712
TRESTER, K. N82-11586
TRESTER, P. W. N82-11951
TRIPP, J. S. N82-11090
TRUESDALE, R. S. N82-11273
TRUONG, T. K. N82-11295
TSIPOURAS, P. N82-11638
N82-11708
TSUI, M. E. N82-11154
TSUKISHIMA, T. N82-11925
TSUN, T. C. N82-11016

TSUNODA, R. T. N82-11710
TSUO, Y. S. N82-11608
TUDA, T. N82-11924
TURILLON, P. P. N82-11155
TURNER, T. M. N82-11121
N82-11126
N82-11133
TURNER, W. D. N82-11554
TURTLE, J. P. N82-11344
TWENTER, F. R. N82-11534
TYLCZAK, J. H. N82-11193

U

UDWADIA, F. E. N82-11098
UHLMANN, D. R. N82-11216
ULABY, F. N82-11510
ULJANOV, A. M. N82-11760
ULMISHEK, G. N82-11518
UNDERWOOD, R. L. N82-11039
UNNINAYAR, S. N82-11736
URBAN, T. N82-11978

V

VALUEV, E. I. N82-11980
VANBLARICUM, M. L. N82-11350
N82-11351
N82-11352
VANCOUR, R. P. N82-11701
VANDEVENDER, J. P. N82-11908
VANDYCK, O. B. N82-11814
VANKUIKEN, J. N82-11579
VANMAARSEVEEN, I. M. N82-11444
VANTASSEL, R. A. N82-11703
VARLEY, D. T., III N82-11439
VARTSKY, D. N82-11775
VEDAM, R. N82-11272
VENNE, D. E. N82-11720
VIOTTI, P. N82-11990
VOJNOVICH, T. N82-11217
VONBRIESEN, R. N82-11535
VONROOS, O. N82-12015
VOSS, E. N82-11580
VUILLEMIN, J. J. N82-11970

W

WADE, J. C. N82-11121
N82-11125
WAGMAN, D. D. N82-11170
WAHLIG, M. N82-11593
WAKATANI, M. N82-11924
WALKER, W. R. N82-11425
WALL, J. D. N82-11554
WALLACE, M. A. N82-11794
WALSH, E. K. N82-11266
WALTON, J. R. N82-11264
WANG, J. N82-12026
WANG, J. H. N82-11148
WANG, W. S. N82-11357
WAREKOIS, E. P. N82-11135
WARREN, M. N82-11593
WATANABE, T. N82-11928
WATKINS, D. R. N82-11271
WATKINS, G. D. N82-11966
WATLING, R. J. N82-11444
WATSON, A. P. N82-11574
WATSON, J. N82-11902
WEBB, J. D. N82-11559
WEBER, R. E. N82-11547
WEBSTER, G. L. N82-11866
WEGNER, H. E. N82-11897
WEI-ZAO, G. N82-11027
WEI, T. C. N82-11443
WEINBERGER, A. J. N82-11643
WEINGART, R. N82-11374
WEINSTEIN, B. W. N82-11916
WEINSTEIN, C. J. N82-11348
WEISS, L. S. N82-11614
WEISS, M. F. N82-11994
WELLS, I. C. N82-11779
WELLS, J. W. N82-11151
WELSH, D. C. N82-11747
WEN, Y. K. N82-11327
WESTON, A. M. N82-11264
WESTWIG, R. A. N82-11913
WHEELER, K. R. N82-11193
WHEELER, M. G. N82-11262
WHITE, J. B. N82-11656
N82-11784
WHITE, K. N82-11218
WHITE, N. M. N82-11407
WHITE, R. A. N82-11887
WHITEHEAD, G. L. N82-11930
WHITENER, J. E. N82-11437
WHITLEY, J. B. N82-11951
WHITMAN, K. N82-11898
WIDEN, A. N82-11758
WIDNALL, S. E. N82-11071
WIDNER, M. M. N82-11952
WIEDENBECK, M. E. N82-12019
WIEDERHOLD, G. C. N82-11987
WIELICKI, B. A. N82-11732
WIELOPOLSKI, L. N82-11775
WIENER, D. E. N82-11614
WIENER, H. L. N82-11838
WIERSMA, G. B. N82-11717
WIKER, G. A. N82-11785
WILCOCK, D. F. N82-11466
WILHELM, W. G. N82-11584
WILKE, N. N82-11459
WILLENBORG, D. L. N82-11916
WILLIAMS, J. G. N82-11554
WILLIAMS, R. C. N82-11042
WILLIAMS, R. L. N82-11175
WILLSHIRE, W. L., JR. N82-11860
WILMOTH, R. G. N82-11046
WILSON, D. G. N82-11410
WINER, W. O. N82-11466
WINKELSTEIN, R. N82-11299
WINSTON, J. S. N82-11735
WISE, J. L. N82-11200
WISER, W. H. N82-11259
N82-11260
WITSCHI, H. P. N82-11777
WITT, A. F. N82-11958
WOBBEKING, T. F. N82-11172
WOLAK, F. N82-11988
WOLFF, E. G. N82-11134
WOLTON, I. N82-11036
N82-11037
WONDER, E. N82-11892
WOODBURY, M. P. N82-11751
WOODLEY, W. L. N82-11737
N82-11738
WOODRUFF, E. M. N82-11149
WOODWARD, J. B. N82-11576
WORKHOVEN, R. M. N82-11617
WORKMAN, G. L. N82-11094
WORLTON, J. N82-11796
WORMS, F. N82-11771
WORRALL, M. N82-11653
WRIGHT, C. N82-11745
WRUCK, D. N82-11618
WU, T. T. N82-11342
WUNSCH, P. K. N82-11544
WYOUNG, A. N82-11463

X

XIAO-KANG, X. N82-11015
XU, C. Y. N82-12024

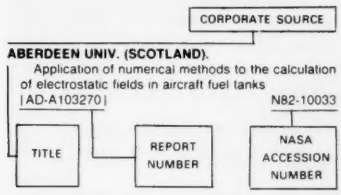
Y

YAKOVLEVA, I. Y. N82-11764
YAMADA, H. N82-11358
YAMAKAWA, K. A. N82-11469
N82-11548
YANAN, J. N82-11447
YASU, N. N82-11976
YASUDA, I. N82-11473
YBARRA, A. H. N82-11042
YEARGAN, J. R. N82-11554
YEATER, M. L. N82-11283
YEGOROV, I. A. N82-11757
YELATOMTSEV, B. V. N82-11765
YI, Y. N82-11451
YIN-DA, H. N82-11026
YING, Z. N82-11025
YIP, L. P. N82-11013
YIP, S. N82-11973
YNGVE, P. W. N82-11616
YOSHIDA, T. N82-11067
YOUNG, D. C. N82-11165
YOUNG, D. L. N82-11144
YOUNG, M. N82-11920
YOUNG, S. J. N82-11112
YOUNG, W. E. N82-11947
YOUNGMAN, R. A. N82-11375
YU-MING, Z. N82-11027
YUAN, C. P. N82-11343
YUAN, K. Y. N82-11851

Z

ZACHOR, A. S. N82-11639
ZACK, J. W. N82-11719
ZAGARINO, P. A. N82-11919
ZAIDER, M. N82-11885
ZANDER, F. H. N82-11616
ZAPLATYNSKY, I. N82-11210
ZEMBRUZUSKI, T. J., JR. N82-11533
ZEREWEKHN, P. S. N82-11125
ZERWEKH, P. S. N82-11130
ZEWEKH, P. S. N82-11121
N82-11131
ZHAO-YAN, Q. N82-11024
ZHEN-PING, S. N82-11021
ZHEN-XUE, J. N82-11020
ZHIMIN, Q. N82-11447
N82-11448
ZHUAN-SHE, D. N82-11025
ZHUKOVA, V. M. N82-11180
ZIMING, X. N82-11451
ZIMMERMAN, E. A. N82-11531
ZUK, W. N82-11332
ZUMWALDE, R. D. N82-11780
ZUO-REN, J. N82-11025
ZVIGINTSEV, N. V. N82-11186
ZWISSLER, J. G. N82-11209

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACRES AMERICAN, INC., BUFFALO, N.Y.
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8: Design approaches: UPH
[DE81-030673] N82-11620

ACRES AMERICAN, INC., COLUMBIA, MD.
Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 9: Design approaches: CAES, appendix C. Major mechanical equipment
[DE81-030672] N82-11621

ACUREX CORP., MOUNTAIN VIEW, CALIF.
Kinetics of NO/ sub x formation during early stages of pulverized-coal combustion
[DE81-029071] N82-11641
Survey of particulate emission macro- and micro-sampling and sizing methods
[DE81-028348] N82-11642

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Operational environment, meteorological conditions and weather forecasting N82-11057
Technology base for icing instrumentation and mathematical modelling N82-11058
Facilities for development and clearance N82-11059
Ice protection system technology N82-11060
Proposed standard requirements and procedures for icing clearance N82-11061
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073

AEROCHEM RESEARCH LABS., INC., PRINCETON, N. J.
Soot formation in synfuels
[DE81-030273] N82-11164

AEROJET ENERGY CONSERVATION CO., SACRAMENTO, CALIF.
Fluid-bed heat-exchanger optimization and bed materials selection
[DOE/ET-11343/T2] N82-11571

AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AFB, OHIO.
Investigation of spatial disorientation of F-15 Eagle pilots
[AD-A104684] N82-11781

AEROSPACE CORP., EL SEGUNDO, CALIF.
Random error propagation analysis in the plume diagnostic code EMABIC
[AD-A104495] N82-11112
Thermal expansion of metal matrix composites
[AD-A104680] N82-11134

AEROSPACE CORP., LOS ANGELES, CALIF.
Near-term goals for alcohol fuels from biomass: An overview of resource requirements, land use, environmental, and socioeconomic impacts
[DE81-029987] N82-11245
Assessment of flywheel system benefits in selected vehicle applications
[DE81-025976] N82-11997

AGRI STILLS OF AMERICA, SPRINGFIELD, ILL.
Development of a small-scale commercial alcohol dehydration 190 to 200 proof
[DE81-030158] N82-11235

AIR FORCE ACADEMY, COLO.
Military space doctrine: The great frontier
[AD-A104574] N82-11990

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.
The angular impact distribution of charged particles attracted to a charged cylindrical spacecraft
[AD-A104519] N82-11108
Stratospheric trace gas composition studies utilizing in situ cryogenic, whole-air sampling methods
[AD-A104375] N82-11689
High latitude electron detectors on Satellite P78-1: Preliminary data results
[AD-A104518] N82-11701
A simplified procedure for direct determination of real heights from virtual height data
[AD-A104374] N82-11702
Rocket data of solar EUV flux, thermospheric electron flux and N2 second-positive airglow emission
[AD-A104384] N82-11703
Report on research at AFGL
[AD-A104513] N82-11704
An assessment of detecting mesoscale rainfall from mid-latitude cyclones using GOES imagery data
[AD-A104377] N82-11726

AIR FORCE HUMAN RESOURCES LAB., BROOKS AFB, TEX.
Second Image Generation/Display Conference: Closing comments
[AD-A104676] N82-11807

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Fidelity optimization of microprocessor system simulations
[AD-A104679] N82-11786

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Acta mechanica sinica
[AD-A105184] N82-11014
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted N82-11015
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016
Acta Mechanica Sinica (selected articles)
[AD-A105636] N82-11019
On transonic flow in hyperbolic Laval nozzles N82-11020
Compression processes of free pistons after the opening of nozzle in a hypersonic gun tunnel N82-11021
Prediction of turbulent boundary layer separation N82-11022
Journal of Engineering Thermophysics (selected articles)
[AD-A105604] N82-11023
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade N82-11024
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor N82-11025
A primary research on ablation experiment technique of the turbulent flow over a flat plate specimen N82-11026
A new method of cooling turbine vanes N82-11027
Research on the recirculating flow rate in the wake of two-dimensional flame stabilizers (under cold conditions) N82-11028
Acta Mechania Sinica
[AD-A105635] N82-12021
Difference method in fluid dynamics. 1. Numerical solution of two dimensional vorticity equation N82-12022
On the kernel function collocation method in steady subsonic flow for wing with control surfaces N82-12023
On the capacity of holographic phase-shift interferometric technique in the visualization of low density flows N82-12024
Analytical design for internal burning star grains of solid rockets N82-12025
Numerical computation and analysis of the flow field in a large shock tube with a variable cross-sectional area N82-12026

AIR FORCE WEAPONS LAB., KIRTLAND AFB, N. MEX.
High energy density capacitor testing for the AFWL SHIVA
[DE81-023688] N82-11379

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Jet fuel locks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
Mass spectrometry of the CO2 laser plasma
[AD-A104344] N82-11454

AIR PRODUCTS AND CHEMICALS, INC., ALLENTOWN, PA.
Catalyst and reactor development for a liquid-phase Fischer-Tropsch process
[DE81-028209] N82-11168

AIRESEARCH MFG. CO., TORRANCE, CALIF.
Brayton/Rankine 10-ton gas-fired space conditioning system, phase 2
[PB81-223372] N82-11478
Light-commercial Brayton/Rankine space-conditioning system
[DE81-024137] N82-11586

ALASKA UNIV., FAIRBANKS.
Imperfect magnetosphere-ionosphere coupling and discrete auroras
[AD-A104509] N82-11699

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, NEW YORK.
Energy analysis sample building data
[DE81-027188] N82-11318
Proposed simplified energy calculation procedure for use in energy conservation standards activities
[DE81-027190] N82-11319

AMERIGAS, INC., VALLEY FORGE, PA.
Conceptual design for a multi-user medium BTU coal gasification complex. Volume 1: Executive summary
[DE81-027139] N82-11238

AMES LAB., IOWA.
Superconducting proximity effect for in situ and model layered systems
[DE81-025530] N82-11372

Hodges residence: Performance of a direct gain passive solar home in Iowa
[DE81-025528] N82-11581

Liquid-liquid chromatography fractionation of organic compounds in complex mixtures: Application to automobile exhaust
[DE81-030743] N82-11650

ANACAPA SCIENCES, INC., SANTA BARBARA, CALIF.
Conceptual design of a computer-generated topographic display system to aid mission planning and mission conduct by Army aviators
[AD-A104388] N82-11517

ANALYTIC SCIENCES CORP., READING, MASS.
Application of optimal control techniques to tactical missile guidance N82-11086

Military geodesy and geospace science, unit three
[AD-A105072] N82-11711

ANALYTICAL MECHANICS ASSOCIATES, INC., HAMPTON, VA.
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Energy programs at the John Hopkins University Applied Physics Laboratory
[PB81-218141] N82-11535

ARGONNE NATIONAL LAB., ILL.
Vertical combustor for refuse combustion
[DE81-030002] N82-11152

Materials technology for coal-conversion processes
[DE81-028474] N82-11169

Advanced system experimental facility: Solid waste to methane gas. Background and process description
[DE81-030198] N82-11244

Site And Neighborhood Design (SAND): Development of simplified automated building thermal load procedures, phase 1
[DE81-027138] N82-11317

Petroleum geology and resource assessment of the middle Caspian Basin, USSR, with special emphasis on the Uzen field
[DE81-029951] N82-11518

Preliminary evaluation of advanced coal-based electricity-generating technologies by means of system-integration analysis
[DE81-029989] N82-11573

Calcium/metal sulfide battery development program
[ANL-81-14] N82-11578

Analysis of the fuel and cost effects of interfacing utilities and small-power cogenerators
[DE81-028495] N82-11579

Recent advances in lead-acid cell research and development
[DE81-023104] N82-11580

Solid and hazardous energy wastes: Synfuels. 1: Review of research activities
[DE81-028503] N82-11644

Role of excited states of molecular ions in structure studies with high-energy collisions
[DE81-023898] N82-11881

Comparison of costs for solidification of high-level radioactive waste solutions: Glass monoliths vs. metal matrices
[ANL-80-121] N82-11890

Storage ring injection
[DE81-023846] N82-11901

Heavy ion fusion program at Argonne
[DE81-023905] N82-11902

Electronic structure and many-body effects in Pd
[DE81-023110] N82-11970

Lithium/iron sulfide cell development for electric-vehicle propulsion
[DE81-023570] N82-11996

ARIZONA DEPT. OF WATER RESOURCES, PHOENIX.
Equipment for flood and flash flood warning systems
[PB81-224131] N82-11749

ARIZONA STATE UNIV., TEMPE.
A structural study of aluminosilicate glasses by Raman spectroscopy N82-11138

ARIZONA UNIV., TUCSON.
Sulfur pollution control. Phase 1: The disposal program
[PB81-222612] N82-11652

Sulfur pollution control. Phase 2: The impact of stack gas cleanup on the sulfur mining industry of Texas and Louisiana
[PB81-222820] N82-11653

Sulfur pollution control. Phase 1: The disposal program (sections 5 through 7)
[PB81-222804] N82-11655

Liners of natural porous materials to minimize pollutant migration
[PB81-221863] N82-11663

ARKANSAS UNIV., FAYETTEVILLE.
Mississippi County Community College solar photovoltaic project
[DE81-030669] N82-11554

ARKLA INDUSTRIES, INC., EVANSVILLE, IND.
Development and demonstration of an ammonia-water absorption heat pump
[DE81-024126] N82-11424

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
The effects of gaseous atmospheres on the performance characteristics of aluminum-sodium nitrate flares
[AD-A104383] N82-11227

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
Activation of superalloys and stainless steels for chromium plating
[AD-A104313] N82-11188

ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, FORT MONMOUTH, N. J.
Evaluation of alpha aluminum phosphete for advanced acoustic wave devices
[AD-A104685] N82-11962

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Probabilistic modeling of subgrade soil strengths
[AD-A104336] N82-11315

Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498

Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 2: Manual for the WESLIQID finite element program
[AD-A104546] N82-11499

Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 3: Manual for the WESLAYER finite element program
[AD-A104547] N82-11500

Inclusion of a simple vegetation layer in terrain temperature models for thermal infrared (IR) signature prediction
[AD-A104469] N82-11910

ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Mechanism of Monuron-accelerated dicyandiamide cure of epoxy resins
[AD-A104658] N82-11213

ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
A computer solution to the stationary Navier-Stokes equations in two dimensions with proven convergence
[NASA-TM-81300] N82-11398

ARO, INC., ARNOLD AIR FORCE STATION, TENN.
Analytical studies of high-pressure MHD accelerators
[AD-A104686] N82-11930

ATHENS COLL., ALA.
Space processing of electronic materials
[NASA-CR-161892] N82-11094

ATMOSPHERIC RADIATION CONSULTANTS, ACTION, MASS.
Proof of concept study
[AD-A104338] N82-11639

AUBURN UNIV., ALA.
Conductor fatigue-life research
[DE81-904209] N82-11369

AUTOMATION INDUSTRIES, INC., SILVER SPRING, MD.
Solar energy system performance evaluation: Forest City Dillon, Washington, D.C., January 1980 - December 1980
[DE81-028174] N82-11560

Solar energy system performance evaluation: Mpntecito Pines, Santa Rosa, California, November 1979 - April 1980
[DE81-028175] N82-11561

AVCO-EVERETT RESEARCH LAB., MASS.
Preignition volatile yield as related to coal characteristics
[DE81-027584] N82-11250

Conceptual design of an angular multiplexed rare gas halide laser fusion driver
[DE81-029900] N82-11458

B

BABCOCK AND WILCOX CO., ALLIANCE, OHIO.
Computational tools for pulverized-coal combustion
[DE81-028582] N82-11148

BALL AEROSPACE SYSTEMS DIV., BOULDER, COLO.
Development of the coastal zone color scanner for NIMBUS 7. Volume 1: Mission objectives and instrument description
[NASA-CR-166720-VOL-1] N82-11511

BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Development of inverse Raman spectroscopy for probing rapidly decomposing explosives and propellants
[AD-A104382] N82-11226

Numerical differentiation of noisy data
[AD-A104631] N82-11831

BARRY (THEODORE) AND ASSOCIATES, LOS ANGELES, CALIF.
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566

Study of photovoltaic cost elements. Volume 3: Sandia National Laboratories photovoltaic systems design catalog
[DE81-030986] N82-11567

Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568

Study of photovoltaic cost elements. Volume 5: Installation cost model for intermediate PV systems: Users manual
[DE81-030981] N82-11569

BATTELLE COLUMBUS LABS., OHIO.
Thermal and chemical effects in high pressure rolling/sliding contacts
[AD-A104473] N82-11471

BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
Conduct a state-of-the-art survey of existing knowledge for the design of ground-source heat pumps
[DE81-024084] N82-11420

BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Techniques for geothermal liquid sampling and analysis
[DE81-030151] N82-11149

Deposition and corrosion phenomena on aluminum surfaces under deluged dry cooling-tower conditions
[DE81-025483] N82-11193

Production and utilization of methane from anaerobic sludge digestion in U.S. wastewater-treatment plants
[DE81-029958] N82-11246

Transportation fuels from synthetic gas
[DE81-029614] N82-11258

Sampling design for the 1980 commercial and multifamily residential building survey
[DE81-028783] N82-11320

Mean values and an inverse problem for porous media flow
[DE81-027210] N82-11411

BECHTEL CORP., SAN FRANCISCO, CALIF.
Alternative fuel for the steel industry of Northern Indiana: A prefeasibility study of a central coal gasification project
[DE81-029314] N82-11233

BEDFORD RESEARCH ASSOCIATES, MASS.
Chebyshev polynomial approximation in the OPAQUE program
[AD-A104317] N82-11638
Two variable modelling of equatorward boundary of auroral precipitation
[AD-A104378] N82-11708
Data base specifications for the OPAQUE program
[AD-A104340] N82-11709

BELL-NORTHERN RESEARCH LTD., OTTAWA (ONTARIO).
Electromagnetic field mapping of cylinder and missile nosecone
[AD-A104312] N82-11104

BEN GURION UNIV. OF THE NEGEV, BEERSHEVA (ISRAEL).
Dislocation induced noises in semiconductors at low and high temperatures
[AD-A104449] N82-11960

BENDIX CORP., KANSAS CITY, MO.
Stress relaxation of cellular silicone material: 1981
[DE81-030692] N82-11137
Tooling for electrochemical deburring
[DE81-030190] N82-11475

BETH ISRAEL HOSPITAL, BOSTON, MASS.
Molecular events basic to cellular radiation response
[DE81-027898] N82-11776

BIONETICS CORP., HAMPTON, VA.
Small conductive particle sensor
[NASA-CASE-LAR-12552-1] N82-11431
Handbook for industrial noise control
[NASA-SP-5108] N82-11858

BODENSEEWERK GERAETETECHNIK G.M.B.H., UEBERLINGEN (WEST GERMANY).
Practical design and realization of a digital adaptive flight control system N82-11079

BOEING AEROSPACE CO., SEATTLE, WASH.
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems. Volume 1: Executive summary
[NASA-CR-165502-VOL-1] N82-11110
Study of electrical and chemical propulsion systems for auxiliary propulsion of large space systems, volume 2
[NASA-CR-165502-VOL-2] N82-11111
Analysis of space systems study for the space disposal of nuclear waste study report. Volume 2: Technical report
[NASA-CR-161888] N82-11889

BOEING CO., HOUSTON, TEX.
Automated water monitor system field demonstration test report. Volume 1: Executive summary
[NASA-CR-166228] N82-11991
Automated water monitor system field demonstration test report. Volume 2: Technical summary
[NASA-CR-166229] N82-11992

BOEING CO., SEATTLE, WASH.
Pulsed DF laser effects study
[AD-A104575] N82-11457

BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
Research on narrowband communications
[AD-A104296] N82-11345

BOOZ-ALLEN AND HAMILTON, INC., BETHESDA, MD.
User needs for solar decision-making tools: The homebuilding industry
[DE81-027293] N82-11325

BOSTON COLL., CHESTNUT HILL, MASS.
Particle trajectories in a model electric field 1
[AD-A104507] N82-11870

BOSTON COLL., WESTON, MASS.
Exploration of coal and anthracitic carbonaceous shale resources, Narragansett Basin, Massachusetts, and Rhode Island
[DE81-030895] N82-11523

BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).
The use of remote active deflectors for feeding UHF relay stations
[BBC-RD-1981/5] N82-11334
Acoustic scaling: A review of progress to date, and of possible future development
[BBC-RD-1981/6] N82-11855

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Hydride chemical compressor, phase 1
[DE81-030199] N82-11155
Submicron-particle absorption spectroscopy by photothermal modulation of MIE scattered light
[DE81-025096] N82-11160
Adsorption of hydrogen on iron and the hydrogen embrittlement of steel
[DE81-025164] N82-11196
Fusion as a source of synthetic fuels
[BNL-29281] N82-11257
Investigation of the zinc electrode reaction
[DE81-030221] N82-11368
Test results of ac superconducting cables
[BNL-29291] N82-11371
Design, operation and performance of a ground coupled heat pump system in a cold climate
[DE81-024257] N82-11412
DOE solar-assisted heat-pump program: Its evolution and its potential
[DE81-026055] N82-11413
Chemical heat pump program: An overview
[DE81-025086] N82-11414
Impurity effects in a-Si:H solar cells
[DE81-025069] N82-11575
Oxygen reduction on carbon-supported platinum fuel-cell electrodes in H sub 3 Po sub 4
[DE81-027303] N82-11582
Solar heat pump simulator
[DE81-024368] N82-11583
Low-cost solar flat-plate-collector development
[DE81-025081] N82-11584
Modeling energy-conservation potentials of community energy-system technologies
[DE81-026059] N82-11589
Intercomparison of techniques for the non-invasive measurement of bone mass
[DE81-029921] N82-11773
Use of nuclear resonant scattering of Gamma rays for in vivo measurement of iron
[DE81-026051] N82-11775
Physics in few dimensions
[DE81-026054] N82-11853
Workshop on Atomic Physics at the National Synchrotron Light Source
[DE81-023507] N82-11874
Use of microprocessors in a neutrino experiment
[DE81-026057] N82-11875
Brookhaven National Laboratory Tandem accelerator upgrading program
[DE81-025093] N82-11897
Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903

BROWN UNIV., PROVIDENCE, R. I.
Analysis of thermal/mechanical energy-conversion concepts
[DE81-027854] N82-11585

BUREAU OF MINES, ALBANY, OREG.
High-temperature enthalpy and X-ray powder diffraction data for aluminum sulfide (Al2S)
[PB81-226250] N82-11174

BUREAU OF MINES, BOULDER CITY, NEV.
Modified-sulfur cements for use in concretes, flexible pavings, coatings, and grouts
[PB81-226870] N82-11333

BUREAU OF MINES, SPOKANE, WASH.
Preventing large-battery explosions
[PB81-227373] N82-11628

C

CALIFORNIA INST. OF TECH., PASADENA.
Modulation/demodulation techniques for satellite communications. Part 4: Appendices
[NASA-CR-164954] N82-11341
Dynamic fracture in viscoelastic solids
[AD-A104687] N82-11494
Mathematical modeling of photochemical air pollution N82-11629
Hotspots, polar wander, Mesozoic convection and the geoid
[NASA-CR-164943] N82-11694

CALIFORNIA POLYTECHNIC STATE UNIV., SAN LUIS OBISPO.
Racking tests of non-structural building partitions (The behavior of architectural (nonstructural) building components during earthquakes)
[PB81-220790] N82-11328

CALIFORNIA UNIV., BERKELEY.
Large gain, negative resistance, and oscillations in superconducting quasiparticle heterodyne mixers
[AD-A104534] N82-11361
International comparison of residential energy use: Indicators of residential energy use and efficiency. Part 1: The data base
[DE81-028550] N82-11592
OTEC environmental biological oceanographic program
[DE81-027402] N82-11645
The isotopic composition of the elements carbon, oxygen, neon, magnesium and silicon in the galactic cosmic rays
[NASA-CR-166715] N82-12019
A review and interpretation of recent cosmic ray beryllium isotope measurements
[NASA-CR-164967] N82-12020

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Bragg curve spectroscopy
[DE81-025827] N82-11161
Microstructure and properties of dual-phase steels containing fine precipitates
[DE81-029946] N82-11192
Speciation of labile and quasi-labile metal complex systems using the Kalman filter
[DE81-025678] N82-11194
Determination of exact orientation relationships between martensite and austenite in steels by microdiffraction
[LBL-12289] N82-11195
Hydrogen production from the photosynthetic bacterium Rhodopseudomonas sphaeroides
[DE81-025831] N82-11256
Novel design of pressure vessels and thermal shields in coal gasifiers
[DE81-025828] N82-11474
Calcium/metal sulfide battery development program
[ANL-81-14] N82-11578
Controls for solar heating and cooling
[DE81-025209] N82-11593
Overview of the applied battery and electrochemical research program
[DE81-027397] N82-11594
Rechargeable molten-salt cells
[DE81-027091] N82-11595
Intergrated assessment for energy-related environmental standards: A summary of issues and findings
[DE81-028552] N82-11648
Efficient methods for calculating the success function of fixed-space replacement policies
[DE81-029847] N82-11795
GRAMPS: A graphics language interpreter for real time, interactive, three dimensional picture editing and animation
[DE81-027398] N82-11811
Stability of permanent-magnet parameters
[DE81-027013] N82-11852
Molecular-beam system for the study of transient combustion processes
[DE81-030663] N82-11872
Elastic and inelastic psi production by muons
[DE81-025326] N82-11877
Proton induction linacs as high-intensity neutron sources
[DE81-025825] N82-11878
Reaction of oxygen atoms with ethylene and vinylbromide
[DE81-025206] N82-11879
Surface-enhanced nonlinear optical effects and detection of adsorbed molecular monolayers
[DE81-027097] N82-11967

Spectrum of four-times ionized niobium, including Zeeman studies of selected lines and laser modification of the population of certain levels in a sliding spark source
[DE81-027554] N82-11968
Classical field theory with Z(3) symmetry
[DE81-027089] N82-11969
Urban ecosystem and resource-conserving urbanism in Third World cities
[DE81-029854] N82-11995

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Elastomer unistructure insulators
[DE81-024366] N82-11219
Microstructure of explosively compacted aluminum nitride ceramic
[UCRL-85274] N82-11220
Solar coal-gasification reactor for hydrocarbon-free synthesis gas
[DE81-026600] N82-11247
Controlled Retracting Injection Point (CRIP) system: A modified-stream method for in situ coal gasification
[DE81-026477] N82-11248
Possible use of coal in Hawaii, 1980 - 2000
[DE81-028266] N82-11263
Correlation of shock-initiation tests for explosives and propellants
[DE81-026533] N82-11264
LLNL underground coal gasification project
[DE81-030634] N82-11267
Performance of a 100-kV, 78kJ electric-gun system
[DE81-025603] N82-11374
Testing and optimizing active rotary flux compressors
[DE81-024376] N82-11378
Lasers in materials processing
[DE81-027657] N82-11460
Dynamic measurement of Poisson's ratio in granular materials at 0.2 to 0.8 GPa
[DE81-027559] N82-11504
On-line failure detection of vibrating structures
[UCRL-86099] N82-11505
Mechanical Energy Storage Technology (MEST) development
[DE81-026800] N82-11596
Report of Lawrence Livermore National Laboratory to the Federal Aviation Agency on the high-altitude pollution program, 1980
[DE81-028264] N82-11647
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE81-027131] N82-11712
Software design of a general purpose data acquisition and control executive
[DE81-026573] N82-11810
RATFIT: A rational equation-of-state fitting program
[DE81-027273] N82-11812
Some notes on operating-system principles
[DE81-030675] N82-11818
Use of molecular beams to support microspheres during plasma coating
[DE81-025601] N82-11873
Statistical versus valence neutron neutron capture in Mo-98
[DE81-023943] N82-11880
Nova pulse power system description and status
[DE81-025600] N82-11898
Microstructures for high-energy X-ray and particle-imaging applications
[DE81-026531] N82-11899
Analysis of standard reference materials by absolute INAA
[DE81-025925] N82-11900
Reflection/transmission phase shift interferometer and viewing optics
[DE81-027658] N82-11916
Polishing-to-figuring transition in turned optics
[DE81-028691] N82-11917
Stimulated Raman scattering in large plasmas
[DE81-026589] N82-11938
Plasma confinement in the TMX tandem mirror
[UCRL-85883] N82-11939
One-dimensional magnetohydrodynamic calculations of a hydrogen-gas puff
[UCRL-85867] N82-11940

CALIFORNIA UNIV., LOS ANGELES.
Magnetic Field Investigation for ISEE mother and daughter spacecraft
[NASA-CR-166713] N82-11105
Non-linear evolution of an obliquely propagating Langmuir wave N82-11385
Three-dimensional lee waves in a continuously stratified fluid N82-11387
Shear flow instabilities in a rotating system N82-11388
The piezomagnetic effect: Limits on detectability using a combined vector and scalar magnetometer array N82-11430
Beach foreshore sedimentation by organic and inorganic processes N82-11630
Environmental protection as an ongoing component of large facilities engineering projects N82-11633
Monte Carlo calculations of the melting point of iron at core pressures N82-11681
Local earthquake travel times and spatial variations of crustal velocity in southern California N82-11687
Upwind difference schemes for hyperbolic systems of conservation laws N82-11820
Hollow cathode, magnetic multipole ion sources for neutral beam injection N82-11888
Finite temperature relativistic magnetohydrodynamic winds N82-11923
M-alpha emission from a disk in the close binary U Cephei: A Monte Carlo simulation N82-12001
The opposition effect of particulate mineral surfaces and condensates: Applications to Saturn's rings N82-12014

CALIFORNIA UNIV., SAN DIEGO.
Special functions and harmonic analysis on P sub n N82-11824
X-ray and gamma-ray observations of pulsed emission from radio pulsars N82-12000

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Mechanical transformation of task heuristics into operational procedures
[AD-A104674] N82-11802
A two-step approach to finite element ordering
[AD-A104320] N82-11827
Detection and study of new heavy particles through jet identification
[DE81-025151] N82-11882

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Epitaxial morphologies and deposition energetics of polyoxymethylene N82-11204
Experiments in high voltage electron microscopy
[DE81-025574] N82-11375

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, BESANCON (FRANCE).
Low temperature quartz crystal oscillator fast warm-up saw oscillator
[AD-A104403] N82-11366

CHERRYWOOD FARMS, WILLIAMSBURG, MICH.
Project demonstration of wind-turbine electricity: Interconnecting a northern Michigan fruit farm with a major utility
[DE81-030950] N82-11380

CHICAGO UNIV., ILL.
Prediction, diagnosis, and causal thinking in forecasting
[AD-A104372] N82-11843

CINCINNATI UNIV., OHIO.
Coal hydrogenation via bonding of metallic compounds to coal, part 1. Solubilization of Illinois bituminous coal - the critical importance of methylene group cleavage, part 2
[DE81-027562] N82-11236

CITY OF DENVER, COLO.
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734

CLARKSON COLL. OF TECHNOLOGY, POTSDAM, N.Y.
Mathematical investigation of linear control systems containing input derivatives N82-11819

CLEMSON UNIV., S.C.
Stabilization characteristics of deposits of biologic solids generated in aerated lagoons
[PB81-224297] N82-11668

COASTAL ENGINEERING RESEARCH CENTER, FORT BELVOIR, VA.
An inexpensive, portable vibracoring system for shallow-water and land application
[AD-A104323] N82-11314
Critical wave conditions for sand motion initiation
[AD-A104376] N82-11400

COECORP, MOUNTAIN VIEW, CALIF.
Workshop proceedings: Combustion Turbine Residual Oil
[EPRI-WS-80-132] N82-11261

COLLEGE OF AERONAUTICS, CRANFIELD (ENGLAND).
A wake source model for asymmetric potential flow past bodies of wedge shape
[C-OF-A-MEMO-8112] N82-11036
A wake source model for non-symmetric flow past bluff bodies in two-dimensional flow
[C-OF-A-MEMO-8109] N82-11037
Generation of axi-symmetric body shapes in subsonic flow by means of polynomial distributions of sources and doublets along the axis of symmetry
[C-OF-A-MEMO-8110] N82-11038

COLORADO DIV. OF HIGHWAYS, DENVER.
Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado
[PB81-224313] N82-11667

COLORADO STATE UNIV., FORT COLLINS.
Studies of heat transfer and water migration in soils
[DE81-023951] N82-11425

COLORADO UNIV. AT BOULDER.
The use of lanthanide chelates as selective complexing sorbents for gas chromatography N82-11139
The quantitative recognition and evaluation of seismic quiescence: Applications to earthquake prediction and subduction zone tectonics N82-11682
Geology of the nahcolite deposits and associated oil shales of the Green River Formation in the Piceance Creek Basin, Colorado N82-11683

COMMUNICATIONS RESEARCH CENTRE, OTTAWA (ONTARIO).
Design methodology and development history of an ISO OSI layered architecture for the Canadian Broadcast Telidon system
[CRC-TN-708-E] N82-11337

COMPUTATIONAL MECHANICS CONSULTANTS, KNOXVILLE, TENN.
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055

COMPUTER SCIENCES CORP., EL SEGUNDO, CALIF.
Magnetic Field Satellite (Magsat) data processing system specifications
[NASA-CR-166737] N82-11103

CONSOLIDATED CONTROLS CORP., EL SEGUNDO, CALIF.
Low temperature latching solenoid
[NASA-CASE-MSC-18106-1] N82-11357

COORDINATING RESEARCH COUNCIL, INC., ATLANTA, GA.
Informational report on the measurement and characterization of diesel exhaust emissions
[PB81-221251] N82-11175

CORNELL UNIV., ITHACA, N. Y.
Ethanol production in southern tier east region of New York: Technical and economic feasibility
[PB81-226979] N82-11275
Theoretical investigation of a passive scalar such as temperature in isotropic turbulence N82-11386
Theoretical investigations into possible X-ray and gamma-ray lasers N82-11445
Eddy current flows around cracks in thin plates for nondestructive testing
[AD-A104407] N82-11481
Detection of vibrations in metallic structures using small passive magnetic fields
[AD-A104405] N82-11495
COCORP traverses in Wyoming and Oklahoma N82-11684
Studies of continental and oceanic crust from seismic, geodetic and magnetic observations N82-11685
Electrical conductivity structure of the San Andreas fault in central California N82-11686
A numerical dynamical investigation of the role of subsynoptic inertial an isallobaric adjustments in organizing severe local storm ensembles N82-11719

Recursive aspects of the theory of real closed fields N82-11849
Finite element analysis of coupled magneto-mechanical problems of conducting plates [AD-A104406] N82-11851
Nonlinear waves on charged particle beams N82-11865
Direct observation of excited oxygen atom production and deactivation N82-11868
The effects of toroidal geometry and scattering by density fluctuations on the accessibility and energy deposition of lower hybrid waves N82-11922
A self-consistent linear-mode analysis of a stellar convection zone N82-12008
A theoretical and experimental investigation of the photometric functions of particulate surfaces N82-12012
The morphology and evolution of Ganymede and Callisto N82-12013

CORNING GLASS WORKS, N.Y.
Single mode optical waveguide design investigation [AD-A104584] N82-11913

COURY AND ASSOCIATES, INC., LAKEWOOD, COLO.
Two-phase flow in geothermal energy sources [DE81-029037] N82-11404

CRAMER (H.E.) CO., INC., SALT LAKE CITY, UTAH.
Calculations from compliance emissions of long and short term SO2 concentrations in the southwest Pennsylvania air quality control region [PB81-226078] N82-11678

CREIGHTON UNIV., OMAHA, NEBR.
Ozone exposure and pulmonary metabolic effects of mediators and hormones [PB81-222408] N82-11779

D

DARTMOUTH COLL., HANOVER, N.H.
Effects of acid precipitation on cation transport in New Hampshire forest soils [DE81-027494] N82-11648

DAYTON UNIV., OHIO.
Estimating the statistical properties of crack growth for small cracks [AD-A104672] N82-11496

DCS CORP., WASHINGTON, D.C.
Assessment of building diagnostics [DE81-027078] N82-11321

DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).
Determination of pulsed CO2 laser damage thresholds of optical surfaces [AD-A104424] N82-11456

DELAWARE UNIV., NEWARK.
Zn3P2 as an improved semiconductor for photovoltaic solar cells [DE81-025587] N82-11577

DENELCOR, INC., DENVER, COLO.
Multiple-instruction, multiple-data path computers: Parallel processing impact on flight simulation software [AD-A104506] N82-11789

DENVER RESEARCH INST., COLO.
Two-phase flow in geothermal energy sources [DE81-029037] N82-11404

DEPARTMENT OF ENERGY, LAS VEGAS, NEV.
Principal facts, accuracies, sources, base station descriptions, and plots for 1380 gravity stations in the Tonopah 1 deg by 2 deg Quadrangle, Nevada [PB81-219081] N82-11716

DEPARTMENT OF ENERGY, MORGANTOWN, W. VA.
Atmospheric fluidized-bed projects technology overview [DE81-027143] N82-11251
Surface coal gasification [DE81-030183] N82-11253
Advanced-gasification processes [DE81-030184] N82-11254

DEPARTMENT OF ENERGY, OAK RIDGE, TENN.
Solvent-Refined Coal-1 Demonstration Project. Final environmental impact statement, Volume 1 of 2 [DE81-025983] N82-11252

DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Electric power supply and demand for the contiguous United States, 1981 - 1990 [DE81-027126] N82-11376
Interrelationships of energy and the economy: A supplement to the National Energy Policy Plan required by Title VIII of the US Department of Energy Organization Act (Public Law 95-91) [DE81-027526] N82-11613
Evaluation and review of alternative waste forms for immobilization of high-level radioactive wastes [DE81-026323] N82-11909

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Control law design for transport aircraft flight tasks N82-11080

DISTRICT OF COLUMBIA UNIV., WASHINGTON, D. C.
Computation of averaged monthly zonal albedo utilizing the solar zenith angle, properties of clear and cloudy atmospheres [NASA-CR-164930] N82-12010

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Hydrogen damage in stainless steel [DP-MS-81-31] N82-11197

E

E-TECH, INC., ATLANTA, GA.
Investigation of direct expansion in ground source heat pumps [DE81-024139] N82-11418

EDGERTON, GERMESHAUSEN AND GRIER, INC., ALBUQUERQUE, N. MEX.
System safety program plan [AD-A104557] N82-11354

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Alcohol fuels in the United States [DE81-026013] N82-11265
Raft River geothermal project groundwater monitoring program [DE81-030202] N82-11521
Bounded limit for the Monte Carlo point-flux-estimator [DE81-026526] N82-11883
Source-to-incident-flux relation in a Tokamak blanket module [DE81-026524] N82-11941
Preliminary activation calculations for the poloidal divertor experiment [DE81-026525] N82-11942

EDGERTON, GERMESHAUSEN AND GRIER, INC., LAS VEGAS, NEV.
Engineering Analysis System (EASY) [DE81-027508] N82-11846
Improvements to a high-frequency fiber-optic system for plasma diagnostics [DE81-028741] N82-11919

EDGERTON, GERMESHAUSEN AND GRIER, INC., SANTA BARBARA, CALIF.
Improvements to a high-frequency fiber-optic system for plasma diagnostics [DE81-028741] N82-11919

EFFECTS TECHNOLOGY, INC., SANTA BARBARA, CALIF.
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 1: Investigation of resonance extraction procedures [AD-A104530] N82-11350
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 2: Appendices [AD-A104531] N82-11351
Investigation of procedures for automatic resonance extraction from noisy transient electromagnetics data. Volume 3: Translation of Prony's method [AD-A104532] N82-11352

EIC, INC., NEWTON, MASS.
Investigation of Lithium Sulfur Dioxide (Li/SO2) battery safety hazard [AD-A104326] N82-11552

EMTEC ENGINEERING, INC., BERKELEY, CALIF.
Electromagnetic scattering by targets over a real Earth [AD-A104492] N82-11347

ENSCO, INC., SPRINGFIELD, VA.
Coal mine hazard detection using synthetic pulse radar [PB81-224412] N82-11538

ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
An evaluation of three-way control single and dual bed catalysts as applied to heavy-duty gasoline engines [PB81-224982] N82-11477
EPA evaluation of the FUEL-MAX device under Section 511 of the Motor Vehicle Information and Cost Savings Act [PB81-229866] N82-11479
EPA evaluation of the Automotive Cylinder Deactivator System (ACDS) under Section 511 of the Motor Vehicle Information and Cost Saving Act [PB81-228256] N82-11480

ENVIRONMENTAL PROTECTION AGENCY, LAS VEGAS, NEV.
Geothermal environmental assessment: Behavior of selected geothermal brine contaminants in plants and soils [PB81-222333] N82-11671
Geothermal environmental assessment baseline study: Vegetation and soils of the Roosevelt Hot Springs geothermal resource area [PB81-223299] N82-11717

ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Control techniques for sulfur oxide emissions from stationary sources, second edition [PB81-220048] N82-11662

ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
An evaluation of the spatial resolution of soil moisture information [NASA-CR-166724] N82-11513
Variations in atmospheric angular momentum [NASA-CR-166712] N82-11690

EVANS-HAMILTON, INC., SEATTLE, WASH.
Index to observations of currents in Puget Sound, Washington, from 1908-1980 [PB81-224115] N82-11753

EXXON RESEARCH AND ENGINEERING CO., FLORHAM PARK, N.J.
Control of utility boiler and gas turbine pollutant emissions by combustion modification, phase 2 [PB81-222267] N82-11654

F

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Threat Alert and Collision Avoidance System (TCAS) Symposium [AD-A104563] N82-11047

FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
COBOL Compiler: Mohawk data sciences MDS COBOL release 12 ANSI 74, series 21-models 40, 50, series 21 operating system 2 [PB81-226425] N82-11798

FEDERAL COMPILER TESTING CENTER, WASHINGTON, D.C.
Perkin-Elmer COBOL R06 Perkin-Elmer model 3240 OS/32 REV 05.02 [PB81-223865] N82-11799

FEDERAL HIGHWAY ADMINISTRATION, OKLAHOMA CITY, OKLA.
Bearing capacity and characterization of compressible Clayey and Silty Foundation soils in Oklahoma [PB81-231607] N82-11330

FEDERAL HIGHWAY ADMINISTRATION, RALEIGH, N. C.
Evaluation of base courses for flexible pavements [PB81-218372] N82-11329

FEDERAL HIGHWAY ADMINISTRATION, WASHINGTON, D.C.
Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado [PB81-224313] N82-11667

FLOW RESEARCH, INC., KENT, WASH.
Calculations of transonic potential flow over cascades [NASA-CR-165471] N82-11041

FOOD AND DRUG ADMINISTRATION, ROCKVILLE, MD.
Forecast of emerging technologies [PB81-227290] N82-11998

FOSTER-MILLER ASSOCIATES, INC., WALTHAM, MASS.
Recommended guidelines for oxygen self-rescuers. Volume 1: Underground coal mining
[PB81-225872] N82-11782
Recommended guidelines for oxygen self-rescuers. Volume 2: Appendices
[PB81-225880] N82-11783
FRANKLIN ASSOCIATES, PRAIRIE VILLAGE, KANS.
Preliminary development of a technique for estimating municipal-solid-waste generation
[DE81-024152] N82-11590

G

GABRIELSON (JAMES E.), PLYMOUTH, MINN.
Cattail rhizome-derived alcohol
[DE81-028307] N82-11234
GCA CORP., BEDFORD, MASS.
New Hampshire and Vermont point source inventory update for NECRMP
[PB81-219339] N82-11672
GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
FAA misses opportunities to discontinue or reduce operating hours of some airport traffic control towers
[PB81-224214] N82-11049
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 1
[PB81-225286] N82-11675
Better monitoring techniques are needed to assess the quality of rivers and streams, volume 2
[PB81-225294] N82-11676
Information of mission and functions of the National Bureau of Standards
[PB81-228207] N82-11761
Civil servants and contract employees: Who should do what for the Federal Government
[PB81-219966] N82-11979
GENERAL ATOMIC CO., SAN DIEGO, CALIF.
Guide to the data-acquisition software of the Doublet III computer system
[DE81-026616] N82-11813
KUGEL: A thermal, hydraulic, fuel performance and gaseous fission product release code for pebble bed reactor core analysis
[DE81-026561] N82-11904
GENERAL ELECTRIC CO., ARLINGTON, VA.
The effects of the symbology and spatial arrangement of software specifications in a debugging task
[AD-A104541] N82-11806
GENERAL ELECTRIC CO., BINGHAMTON, N.Y.
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064
Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Engineering approach for elastic-plastic fracture analysis
[DE81-904218] N82-11502
GENERAL MOTORS TECHNICAL CENTER, WARREN, MICH.
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029824] N82-11565
GEOLOGICAL SURVEY, ALBUQUERQUE, N. MEX.
Flow routing in the Susquehanna River Basin: Part 4 - routing reservoir releases in the eastern Susquehanna River Basin in New York State
[PB81-221533] N82-11533
GEOLOGICAL SURVEY, ANCHORAGE, ALASKA.
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532
GEOLOGICAL SURVEY, AUGUSTA, MAINE.
Water resources data for Maine, water year 1980
[PB81-226789] N82-11541
GEOLOGICAL SURVEY, BAY SAINT LOUIS, MISS.
Temperature and solute-transport simulation in streamflow using a Lagrangian reference frame
[PB81-225757] N82-11543
GEOLOGICAL SURVEY, CHEYENNE, WYO.
Water resources of upper separation creek basin, south-central Wyoming
[PB81-224263] N82-11531
GEOLOGICAL SURVEY, COLUMBUS, OHIO.
Water resources data for Ohio, water year 1980. Volume 2: St. Lawrence River basin
[PB81-217077] N82-11528
GEOLOGICAL SURVEY, LAKEWOOD, COLC.
Waste-assimilation capacity of the Arkansas River in Pueblo County, Colorado, as it relates to water-quality guidelines and stream classification
[PB81-227340] N82-11540
Rainfall-runoff modeling and preliminary regional flood characteristics of small rural watersheds in the Arkansas river basin in Colorado
[PB81-224313] N82-11667
Variations in climatic characteristics as related to evapotranspiration in South Park, Central Park County, Colorado
[PB81-219610] N82-11734
GEOLOGICAL SURVEY, LANSING, MICH.
Water resources data for Michigan, water year 1980
[PB81-224180] N82-11527
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534
GEOLOGICAL SURVEY, LOUISVILLE, KY.
Water resources data for Kentucky, water year 1980
[PB81-223612] N82-11526
GEOLOGICAL SURVEY, MENLO PARK, CALIF.
Principal facts, accuracies, sources, base station descriptions, and plots for 1380 gravity stations in the Tonopah 1 deg by 2 deg Quadrangle, Nevada
[PB81-219081] N82-11716
GEOLOGICAL SURVEY, NASHVILLE, TENN.
Water resources data for Tennessee, water year 1979
[PB81-228249] N82-11539
GEOLOGICAL SURVEY, PORTLAND, OREG.
Water resources data for Oregon, water year 1979
[PB81-226771] N82-11542
GEOLOGICAL SURVEY, TALLAHASSEE, FLA.
Ground-water hydrology of the Dade City area, Pasco County, Florida, with emphasis on the hydrologic effects of pumping from the Floridan aquifer
[PB81-225518] N82-11529
GEORGETOWN UNIV., WASHINGTON, D.C.
Vibrational sensitization of of 14N14NO, 15N14NO and H2O by laser excited SF6 N82-11143
GEORGIA INST. OF TECH., ATLANTA.
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals
[NASA-CR-165479] N82-11466
Electrochemical conditions within stress corrosion cracks (experimental techniques)
[AD-A104246] N82-11497
An assessment of selected solar energy industry activities
[PB81-222424] N82-11623
GOODYEAR AEROSPACE CORP., AKRON, OHIO.
SAR processing on the MPP
[NASA-CR-166726] N82-11801
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903
GTE SYSTEMS GROUP, NEEDHAM, MASS.
Local distribution fiber optic cable communication system
[AD-A104491] N82-11911
GULF RESEARCH AND DEVELOPMENT CO., PITTSBURGH, PA.
Investigation of mechanisms of hydrogen transfer in coal hydrogenation
[DE81-030492] N82-11165
GULF SCIENCE AND TECHNOLOGY CO., PITTSBURGH, PA.
Effects of components of synfuels on soot formation
[DE81-027961] N82-11242

H

HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Irradiation-induced swelling in commercial alloys
[DE81-029755] N82-11191
Zircaloy cladding: Tough containment for spent fuel storage
[DE81-024105] N82-11896
HARRY DIAMOND LABS., ADELPHI, MD.
The deconvolution of aerosol backscattered optical pulses to obtain system-independent aerosol signatures
[AD-A104578] N82-11914
Symmetries of the nonlinear conductivity for a relativistic turbulent plasma
[AD-A104544] N82-11931
HARVARD UNIV., CAMBRIDGE, MASS.
Scattering of electromagnetic waves by obstacles in the presence of the Earth's surface
[AD-A104242] N82-11342
Molecular spectroscopy and relaxation in supersonic beams N82-11867
Optical and ultraviolet studies of stellar chromospheres of lambda Andromedae and other late-type stars N82-12003
HAWAII UNIV., HONOLULU.
A method for using aerial photos in delineating historic patterns of beach accretion and retreat
[PB81-223836] N82-11536
Plasmaspheric, faraday and total electron contents, 1977 and 1978
[AD-A104362] N82-11700
HONEYWELL, INC., CLEARWATER, FLA.
Manufacturing methods and technology engineering for tape chip carrier
[AD-A104393] N82-11365
HONEYWELL SYSTEMS AND RESEARCH CENTER, MINNEAPOLIS, MINN.
Design techniques for mutlivariable flight control systems N82-11078
HOUSTON UNIV., TEX.
Two-phase flow in geothermal energy sources
[DE81-029037] N82-11404
HOWARD UNIV., WASHINGTON, D. C.
On the shape and orientation control of an orbiting shallow spherical shell structure
[NASA-CR-164970] N82-11100
Study of foldable elastic tubes for large space structure applications, phase 3
[NASA-CR-164929] N82-11493
Some analysis on the diurnal variation of rainfall over the Atlantic Ocean
[NASA-CR-164937] N82-11724
HUGHES AIRCRAFT CO., EL SEGUNDO, CALIF.
Study and development of an integrated head-up display
[AD-A104337] N82-11062
HUGHES AIRCRAFT CO., TORRANCE, CALIF.
Failure mechanism study of GaAs technology
[AD-A104440] N82-11963
HYDROGEN CONSULTANTS, INC., DENVER, COLO.
Hydride chemical compressor, phase 1
[DE81-030199] N82-11155

I

IDL CHEMICALS LTD., HYDERABAD (INDIA).
AC firing ability of detonation
[PB81-216053] N82-11272
IIT RESEARCH INST., CHICAGO, ILL.
Evaluation of the effects of solar radiation on glasses
[NASA-CR-161907] N82-11207
ILLINOIS INST. OF TECH., CHICAGO.
Activity and diffusion of metals in binary aluminum alloys
[DE81-025535] N82-11199
ILLINOIS UNIV. AT CHICAGO CIRCLE, CHICAGO.
Studies of the kinetics and mechanism of gas-surface reactions on metal and metal oxide surfaces N82-11140
Vertical combustor for refuse combustion
[DE81-030002] N82-11152
On permanents and diagonal products of doubly stochastic matrices N82-11832
Linear evolution equations of hyperbolic type in a locally convex space N82-11850
ILLINOIS UNIV. AT URBANA.
Study of microstrip antenna elements, arrays, feeds, losses, and applications
[AD-A104493] N82-11343
ILLINOIS UNIV. AT URBANA-CHAMPAIGN.
Stochastic models for dependent load processes
[PB81-219735] N82-11327

ILLINOIS UNIV., URBANA.
Contribution to the characterization of the anelastic properties of multi-phase systems
[DE81-025581] N82-11198
Heavy ion beam interaction and energy partition in the initial stages of ICF target irradiation
[DE81-025296] N82-11903
High-pressure optical studies
[DE81-025577] N82-11918
INDIAN INST. OF GEOMAGNETISM, BOMBAY.
Geomagnetic observations N82-11693
INTERGRAPH CORP., HUNTSVILLE, ALA.
Digital ultrasonics signal processing: Flaw data post processing use and description
[NASA-CR-161882] N82-11862
INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.
Precipitation characteristics of summer storms at Straight Canyon barometer, Watershed, Utah
[PB81-223950] N82-11750
INTERNATIONAL CITY MANAGEMENT ASSOCIATION, WASHINGTON, D.C.
Applying science and technology to improve local government productivity
[PB81-217986] N82-11978
INTERNATIONAL SCIENCE AND TECHNOLOGY INST., INC., WASHINGTON, D. C.
Assessment of oil-shale technology in Brazil
[DE81-027574] N82-11249
IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
The 4-day temperature wave in the winter polar stratosphere N82-11720
An electrostatic model for energies of molecules in solution N82-11869
Theoretical and observational aspects of stellar variability N82-12007

J

JAYCOR, WOBURN, MASS.
A review of an attempt to create shatter cones with magnetic flyer plate technology
[NASA-CR-164614] N82-11492
JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
A proposed new policy for planetary protection
[NASA-CR-164947] N82-11095
Nonparametric identification of a class of nonlinear close-coupled dynamic systems
[NASA-CR-164948] N82-11098
Fluidized bed coal combustion reactor
[NASA-CASE-NPO-14273-1] N82-11144
Coal desulfurization by low temperature chlorinolysis, phase 3
[NASA-CR-164957] N82-11145
Assessment of advanced coal gasification processes
[NASA-CR-164949] N82-11146
Fracture mechanics of cellular glass
[NASA-CR-164959] N82-11209
The Telecommunications and Data Acquisition report
[NASA-CR-164939] N82-11279
Radio astronomy N82-11280
A dedicated 26-m SETI sky survey instrument facility: A feasibility study N82-11281
DSN ground communication facility N82-11282
Networks consolidation program N82-11283
DSN model for use in strategic planning N82-11284
Pioneers 6 through 12 mission support N82-11285
Strategies for weather-dependent data acquisition N82-11286
Virtual center arraying N82-11287
The deep space optical channel. 2: Wave propagation effects N82-11288
Symbol error rate performance evaluation of the LM37 multimegabit telemetry modulator-demodulator unit N82-11289
RFI channels, 2 N82-11290
The R sub 0 parameter for the Gaussian channel N82-11291
Design of throat section of conical corrugated horns N82-11292
Cryogenic filters for RFI protection N82-11293
Traveling-wave maser, closed cycle refrigerator automation N82-11294
Digital SAR processing using a fast polynomial transform N82-11295
Minimizing the time to troubleshoot a failed system N82-11296
An error budget for the JPL hydrogen maser receiver N82-11297
Removal of drift from frequency stability measurements N82-11298
Closed form evaluation of symmetric two-sided complex integrals N82-11299
Surface resistivity measurements of candidate subreflector surfaces N82-11300
Rehabilitation of 64-meter-antenna radial bearing N82-11301
The quality assurance role in the Deep Space Network N82-11302
Networks consolidation program: Maintenance and Operations (M&O) staffing estimates N82-11303
NOCA upgrade N82-11304
Relocation of the Deep Space Network Maintenance Center N82-11305
Goldstone (GDSCC) administrative computing N82-11306
Special activity utilization of GDSCC antennas during 1980 N82-11307
Goldstone high power radiation control N82-11308
Planetary radar N82-11309
An optimization model for energy generation and distribution in a dynamic facility N82-11310
Telecommunications in cometary environments
[NASA-CR-164956] N82-11340
Low-cost solar array project: Four absolute cavity radiometer (pyrheliometer) intercomparisons at New River, Arizona: Radiometer standards
[NASA-CR-164950] N82-11435
Scriber for silicon wafers
[NASA-CASE-NPO-15539-1] N82-11469
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514
Geologic considerations in underground coal mining system design
[NASA-CR-164961] N82-11516
The effects of impurities on the performance of silicon solar cells
[NASA-CR-164945] N82-11548
Irrigation market for solar thermal parabolic dish systems
[NASA-CR-164955] N82-11549
Secondary and compound concentrators for parabolic dish solar thermal power systems
[NASA-CR-164960] N82-11550
Sewage sludge additive
[NASA-CASE-NPO-13877-1] N82-11634
Automatic multi-banking of memory for microprocessors
[NASA-CASE-NPO-15295-1] N82-11785
System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861
Evaluation of the micro-carburetor
[NASA-CR-164958] N82-11994
Radiative transfer in cometary dust atmospheres: Critique of recent developments
[NASA-CR-164946] N82-12015
JOHNS HOPKINS UNIV., BALTIMORE, MD.
A general moment inequality for the maximum of rectangular partial sums of multiple series
[AD-A104475] N82-11828
Generalized L-, M- and R-statistics
[AD-A104480] N82-11835
A note on a nonparametric maximum penalized likelihood estimator of the probability density function of a positive random variable. AMPLE with positive support
[AD-A104476] N82-11836
An upper bound on the probability density function in terms of Fisher information. A bound to the density function
[AD-A104474] N82-11837
JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
The wave diagrams for diffraction and reflection of a traveling weak shock wave from an open end of a shock tube N82-11017
China report: Science and technology, no. 125
[JPRS-78932] N82-11446
Theoretical analysis of effect of Langmuir flow in ring laser N82-11447
Analytical description of time characteristics of high power laser pulses N82-11448
Analytical description of time characteristics high power laser pulses N82-11449
Characteristics of pulse gold vapor lasor outlined N82-11450
Laser triggered spark gaps under experimental study N82-11451
USSR report. Life sciences biomedical and behavioral sciences, no. 12
[JPRS-79338] N82-11762
Time and information model of human Memory Organization N82-11763
Otolithic reflex and space perception function of cosmonauts N82-11764
Measuring/computing complex for automation of ergonomic experiments N82-11765

K

KAISER ALUMINUM AND CHEMICAL CORP., OAKLAND, CALIF.
Flaw growth of 7075, 7475, 7050 and 7049 aluminum alloy plate in stress corrosion environments: 4-year marine atmosphere results
[NASA-CR-161887] N82-11181
KANNER (LEO) ASSOCIATES, REDWOOD CITY, CALIF.
Magnetic bearings
[DE81-024201] N82-11473
KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system
[NASA-CR-164966] N82-11052
A model describing the microwave emission from a multi-layer snowpack at 37 GHz
[NASA-CR-166708] N82-11510
KENAI PENINSULA BOROUGH, ALASKA.
Hydrologic reconnaissance near Fourth of July Creek, Seward, Alaska
[PB81-223752] N82-11532
KENT STATE UNIV., OHIO.
Adsorption of mixed liquids and solids from water solution onto activated carbon N82-11141
KENTUCKY UNIV., LEXINGTON.
Use of a vegetative filter zone to control fine-grained sediments from surface mines
[PB81-226110] N82-11674
Partial differential equations from dynamic programming equations N82-11822
KMS FUSION, INC., ANN ARBOR, MICH.
Tritium induced X-ray emission from glass shell inertial fusion targets
[DE81-025599] N82-11936
Gas-jet laser-plasma interaction experiments
[DE81-027169] N82-11943

L

LAFAYETTE COLL., EASTON, PA.
Manual of analytical quality control for pesticides and related compounds in human and environmental samples
[PB81-222721] N82-11171
LAMB (F. JOSEPH) CO., WARREN, MICH.
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029824] N82-11565
LANGUAGE SERVICES, KNOXVILLE, TENN.
Decay heat curve evaluation test
[DE81-027181] N82-11976
LAQUE CENTER FOR CORROSION TECHNOLOGY, INC., WRIGHTSVILLE BEACH, N.C.
Effect of mechanical cleaning on seawater corrosion of candidate OTEC heat exchanger materials. Part 2: Tests with Amertap sponge rubber balls
[DE81-029953] N82-11190
LEAR SIEGLER, INC., GRAND RAPIDS, MICH.
Flight trajectory control investigation
[AD-A104542] N82-11048
LEHIGH UNIV., BETHLEHEM, PA.
Crack arrest properties of a 9 percent nickel cryogenic steels
[PB81-227993] N82-11202

Seismic resistance characteristics of reinforced concrete beam-supported floor slabs in building structures: Contribution of floor systems to earthquake resistance of building structural frames
[PB81-219172] N82-11326
Negative-U for point defects in silicon
[AD-A104482] N82-11966

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Packet Speech Systems Technology
[AD-A104373] N82-11348
Photovoltaic operations manual radio station WBNO
[DE81-027439] N82-11603
Carlisle house: An all-solar electric residence
[DOE/ET-20279/133] N82-11622

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
Assessment of I.C. engines as drivers for heat actuated heat pumps
[DE81-024086] N82-11421
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 1, phase 2
[AD-A104552] N82-11484
Research and development of methods for estimating physicochemical properties of organic compounds of environmental concern, part 2, phase 2
[AD-A104553] N82-11485

LOCKHEED-CALIFORNIA CO., BURBANK.
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Application of visible monochromatic auroral imaging data for modeling infrared Earth-limb morphology
[AD-A104343] N82-11706

LOGICON, INC., SAN PEDRO, CALIF.
Analysis of 4&5 data
[AD-A104249] N82-11804

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Outsider's look at flight instrumentation
[DE81-025409] N82-11066
Numerical model study of burning and detonation in small PETN-loaded assemblies
[DE81-028594] N82-11162
Hydrogen storage-bed design for tritium systems test assembly
[DE81-025336] N82-11262
Energy losses in conductors carrying very high currents
[DE81-025367] N82-11373
Diffusivity of particles moving rapidly through a turbulent fluid
[DE81-030414] N82-11408
Performance predictions and measurements for space-power-system heat pipes
[LA-UR-81-909] N82-11426
Performance limits of gravity-assist heat pipes with simple wick structures
[LA-UR-81-969] N82-11427
Heat-pipe development for high-temperature recuperator application
[LA-UR-81-1414] N82-11428
Computer modeling of an all-secondary explosive hot-wire device
[DE81-030438] N82-11439
Report of laser activities: 1978 - 1979
[DE81-028997] N82-11459
Two-dimensional theory and simulation of free electron lasers
[DE81-025365] N82-11461
Magnetic bearings
[DE81-024201] N82-11473
Finite element analysis of the split Hopkinson bar
[DE81-030387] N82-11503
Advanced development of electrical-energy-storage components for high reliability applications
[DE81-025384] N82-11591
Correlation methods
[DE81-025379] N82-11598
Test results and analysis of a convective loop solar air collector
[DE81-028151] N82-11599
Long-term performance of the Hunn passive solar residence
[DE81-028735] N82-11600
Attached sunspace design analysis
[DE81-028738] N82-11601
Heat storage duration
[DE81-026635] N82-11602
Relaxation of geothermal-reservoir stresses induced by heat production
[DE81-032024] N82-11715
Philosophy of supercomputing
[DE81-028586] N82-11796
H-O precessor computer code
[DE81-026669] N82-11814
Electron-temperature requiremernts for neutralized inertial-confinement-fusion light-ion beams
[DE81-025352] N82-11884
Improved calculations of energy deposition from fast neutrons
[DE81-025385] N82-11885
Space nuclear safety and fuels program
[DE81-030501] N82-11891
Improvements to a high-frequency fiber-optic system for plasma diagnostics
[DE81-028741] N82-11919
Uncertainties associated with inertial-fusion ignition
[DE81-025408] N82-11944
Heating of a dense plasma with an intense relativistic electron beam: Initial observations
[DE81-025348] N82-11945
Maximal entropy in fluid and plasma turbulence: A review
[DE81-025388] N82-11946
Quasi-elastic high-pressure waves in 2024 Al and Cu
[DE81-025334] N82-11971
National coal-market conditions for the year 2000: Regional-issue identification and analysis, high scenario
[DE81-026425] N82-11988
Nonradial pulsations of upsilon Orionis and supergiants
[DE81-025338] N82-12005
Linear and nonlinear theory study of Alpha Virginis
[DE81-025335] N82-12006

LOVELACE BIOMEDICAL AND ENVIRONMENTAL RESEARCH INST., ALBUQUERQUE, N. MEX.
Low-Btu-gasifier emissions toxicology
[DE81-031000] N82-11651

LUNAR AND PLANETARY INST., HOUSTON, TEX.
Workshop on Early Crustal Genesis: Implications from Earth
[NASA-CR-164944] N82-11691

M

MAINE UNIV., ORONO.
Effects of acid precipitation on cation transport in New Hampshire forest soils
[DE81-027494] N82-11648

MANLABS, INC., CAMBRIDGE, MASS.
Physical characterization of electronic materials
[AD-A104494] N82-11135

MARYLAND UNIV., COLLEGE PARK.
Selected studies of four high-temperature air-pollution sources N82-11680

MARYLAND UNIV. BALTIMORE COUNTY, CATONSVILLE.
Boundary observability and controllability for diffusion equations
[AD-A104293] N82-11829

MASSACHUSETTS GENERAL HOSPITAL, BOSTON.
Molecular events basic to cellular radiation response
[DE81-027898] N82-11776

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
Optimal control in the lunar module digital autopilot N82-11085
Microstructure of amorphous and semi-crystalline polymers
[AD-A102853] N82-11216
Multiaccess of a slotted channel by finitely many users
[AD-A104417] N82-11349
Oceans and ocean currents: Their influence on climate
[DE81-027263] N82-11731
Distributed computation of fixed points
[AD-A104418] N82-11791
Projected Newton methods and optimization of multicommodity flows
[AD-A104419] N82-11844
Trajectory analysis of the electrons in a magnetron-type gun
[DE81-027860] N82-11905
Theory of electron cyclotron heating in the Constance 2 experiment
[DE81-028269] N82-11906
Antenna-plasma coupling theory for ICRF heating of large Tokamaks
[DE81-029815] N82-11933
RF-driven Tokamak reactor with sub-ignited, thermally stable operation
[DE81-029437] N82-11935
Growth of solid solution single crystals
[NASA-CR-161891] N82-11958
Molecular dynamics simulation of grain-boundary diffusion of vacancies in bcc iron
[DE81-025540] N82-11973

MASSACHUSETTS INST. OF TECH., OAK RIDGE, TENN.
Aluminum recovery from fly ash and shale-retort wastes
[DE81-027675] N82-11154

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Chemorheology and quality control for an adhesive
[AD-A104556] N82-11215

MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON BEACH, CALIF.
Production and characterization of pure cryogenic inertial fusion targets
[DE81-025920] N82-11937

MCDONNELL-DOUGLAS CORP., HUNTINGTON BEACH, CALIF.
Second generation heliostat, volume 1
[DE81-029618] N82-11564
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029824] N82-11565

MCELROY (RALPH) CO., AUSTIN, TEX.
Report of laser activities: 1978 - 1979
[DE81-028997] N82-11459

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Diaphragm Stirling engine heat-actuated heat pump development
[DE81-024076] N82-11423
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
Preliminary study of temperature measurement techniques for Stirling engine reciprocating seals
[NASA-CR-165479] N82-11466

MIAMI UNIV., FLA.
The volumes and heat capacities of nonelectrolytes and organic electrolytes in methanol at 25 C N82-11142

MICHIGAN DEPT. OF NATURAL RESOURCES, LANSING.
Geology and hydrology for environmental planning in Marquette County, Michigan
[PB81-221467] N82-11534

MICHIGAN UNIV., ANN ARBOR.
Time-variable Earth's albedo model characteristics and applications to satellite sampling errors
[NASA-CR-165781] N82-11723

MID-AMERICAN SOLAR ENERGY COMPLEX, BLOOMINGTON, MINN.
MASEC SOLAR 80 home designs
[DE81-028344] N82-11316

MIDWEST RESEARCH INST., GOLDEN, COLO.
User needs for solar decision-making tools: The homebuilding industry
[DE81-027293] N82-11325
Parametric sensitivity study for solar-assisted heat-pump systems
[DE81-030309] N82-11407
Cadmium sulfide/copper sulfide heterojunction cell research by sputter deposition
[DE81-026219] N82-11553
Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027254] N82-11558
Optical transparency of inexpensive salt solutions for construction of density-gradient ponds
[DE81-030832] N82-11559
Thermal and electrochemical biomass conversion at SERI
[DE81-030507] N82-11563

Review of thermally regenerative electrochemical systems, volume 2
[DE81-029624] N82-11572
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE81-025587] N82-11577
Interface reactions in Mg/Zn3P2 solar cells
[DE81-025773] N82-11597
Growth of silicon sheets from metallurgical-grade silicon
[DE81-025703] N82-11605
Use of solar thermal energy to generate electricity
[DE81-028797] N82-11606
Biologically assisted photoelectrochemical cell
[DE81-025905] N82-11607
Thin-film polycrystaline silicon solar cells: Progress and problems
[DE81-025704] N82-11608
National photovoltaic program in amorphous materials
[DE81-025906] N82-11609
Analysis of indium-phosphide/indium tin oxide solar cells
[DE81-025907] N82-11610
Ocean energy-waves, currents, and tides
[DE81-025708] N82-11611
Analysis of solar desiccant systems and concepts
[DE81-023027] N82-11612

MINNESOTA GAS CO., MINNEAPOLIS.
Peat biogasification development program
[DE81-028299] N82-11243

MINNESOTA UNIV., MINNEAPOLIS.
A study of metal-semiconductor contacts on indium phosphide
[AD-A104439] N82-11965

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Magnetohydrodynamic research program of the MHD Energy center at Mississippi State University and structural features of MHD radiant boilers
[DE81-029901] N82-11934

MISSISSIPPI UNIV., UNIVERSITY.
Acoustic cavitation studies
[AD-A104409] N82-11863

MISSOURI RIVER BASIN COMMISSION, OMAHA, NEBR.
Synthetic fuel development for the Upper Missouri River Basin. Section 13: Water assessment report
[PB81-224537] N82-11276
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525

MITRE CORP., MCLEAN, VA.
US energy strategies: Some options for eliminating oil imports by the year 2000
[PB81-226052] N82-11626
Shuttle applications in tropospheric air quality observations
[NASA-CR-145374] N82-11635

MOUND LAB., MIAMISBURG, OHIO.
Manganese glass-molybdenum metallized and copper brazed 99.5% alumina ceramics
[DE81-030423] N82-11218

MUNISING PAPER DIV., NEENAH, WIS.
Development of battery separator composites
[NASA-CR-165508] N82-11547

MYERS (RAYMOND H.), BLACKSBURG, VA.
Methods for presentation and display of multivariate data
[NASA-CR-165788] N82-11833
Applications of non-parametric statistics and analysis of variance on sample variances
[NASA-CR-165789] N82-11834

N

NAGOYA UNIV. (JAPAN).
Theory of drift instabilities and the associated anomalous transport
[IPPJ-REV-1] N82-11924
Least squares autoregressive (maximum entropy) spectral estimation for Fourier spectroscopy and its application to the electron cyclotron emission from plasma
[IPPJ-530] N82-11925
An energy integral and variational principle for plasma kinetic modes
[IPPJ-531] N82-11926
Charge transfer in collisions of Li-3(+) and Be-4(+) ions with atomic hydrogen at low impact energy
[IPPJ-532] N82-11927
Oblique propagation of electron thermal modes below the electron plasma frequency without boundary effects
[IPPJ-533] N82-11928
Boosting up of neutral beam heating power by slowly rising toroidal field
[IPPJ-534] N82-11929

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Technology for large space systems: A special bibliography
[NASA-SP-7046(05)] N82-11093
Where are we in the space war?
[NASA-TM-76604] N82-11096
Hungarian cosmonaut in space
[NASA-TM-76719] N82-11097
Mission operation report: RCA-D/Delta launch
[NASA-TM-84063] N82-11102
The industrial processing of unidirectional fiber prepregs
[NASA-TM-76599] N82-11119
Silicon carbide as an oxidation-resistant high-temperature material. 1: Oxidation and heat corrosion behavior
[NASA-TM-76608] N82-11120
Study of certain features of the electronic structure of the ternary alloys Ni2(Mn, Fe) and Ni3(Mn, Co)
[NASA-TM-76620] N82-11180
Certain physical properties of cobalt and nickel borides
[NASA-TM-76623] N82-11185
Effects of alloying on aging and hardening processes of steel with 20% nickel
[NASA-TM-76624] N82-11186
Technical and economic aspects of hydrogen storage in metal hydrides
[NASA-TM-76610] N82-11223
The storage of hydrogen in the form of metal hydrides: An application to thermal engines
[NASA-TM-76609] N82-11225
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636
Meridional heat transport at the onset of winter stratospheric warming
[NASA-TM-76614] N82-11697
Evaluation of photogrammetric flight under icing conditions on March 23, 1978
[NASA-TM-76617] N82-11725
Cyclic nucleotides in tissues during long-term hypokinesia
[NASA-TM-76726] N82-11757
Laser induced fluoroescence from algae: Results of a ship-borne field test
[NASA-TM-76626] N82-11758
Electron microscopical and histochemical studies on the transverse striated muscles of birds after prolonged hypokinesis
[NASA-TM-76717] N82-11759
Participation of the hypophyseal-adrenal cortex system in thrombin clearance during immobilization stress
[NASA-TM-76729] N82-11760
Effects of curative treatment emphasizing endurance training on the performance and blood pressure of hypertensive and normotensives
[NASA-TM-76520] N82-11771
NASA Patent Abstracts bibliography: A continuing bibliography, section 1, abstracts. Supplement 19
[NASA-SP-7039(19)-SEC-1] N82-11981
NASA Patent Abstracts Bibliography: A continuing bibliography, section 2, indexes. Supplement 19
[NASA-SP-7039(19)-SEC-2] N82-11982
Agreement governing the activities of states on the Moon and other celestial bodies
[NASA-TM-76730] N82-11989
Radiation balances and the solar constant
[NASA-TM-76612] N82-12016

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Algorithm for fuel conservative horizontal capture trajectories
[NASA-TM-81334] N82-11018
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
Optimum climb and descent trajectories for airline missions N82-11082
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083
A computer solution to the stationary Navier-Stokes equations in two dimensions with proven convergence
[NASA-TM-81300] N82-11398

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
Directional flow sensor
[NASA-CASE-FRC-11074-1] N82-11436

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Stirling cycle cryogenic cooler
[NASA-CASE-GSC-12697-1] N82-11312
Low noise tuned amplifier
[NASA-CASE-GSC-12567-1] N82-11359

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336
Low temperature latching solenoid
[NASA-CASE-MSC-18106-1] N82-11357
Logic-controlled occlusive cuff system
[NASA-CASE-MSC-14836-1] N82-11770

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
Some observations on a new numerical method for solving Navier-Stokes equations
[NASA-TP-1934] N82-11032
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
The effects of lateral aerodynamic uncertainties on the handling qualities of the space shuttle orbiter at Mach numbers of 1.5 and .6
[NASA-TM-83193] N82-11051
Management of redundancy in flight control systems using optimal decision theory N82-11084
Wind tunnel supplementary Mach number minimum section insert
[NASA-CASE-LAR-12532-1] N82-11088
An algorithm for minimum-cost set-point ordering in a cryogenic wind tunnel
[NASA-TP-1923] N82-11090
Detection of ultrasonic waves in solids by an optical fiber interferometer N82-11123
DC calibration of the strain sensitivity of a single mode optical fiber interferometer N82-11124
Wideband optical measurements of ultrasonic pulses N82-11132
Aluminum ion-containing polyimide adhesives
[NASA-CASE-LAR-12640-1] N82-11206
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391
Small conductive particle sensor
[NASA-CASE-LAR-12552-1] N82-11431
Dynamic Moire methods for detection of loosened space shuttle tiles
[NASA-TM-83205] N82-11434
An improved transverse shear deformation theory for laminated antisotropic plates
[NASA-TP-1903] N82-11488
Research in nonlinear structural and solid mechanics
[NASA-CP-2147-SUPPL] N82-11489

SPAR data set contents
[NASA-TM-83181] N82-11816
Comparisons of some large scientific computers
[NASA-TM-81928] N82-11817
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[NASA-TM-82728] N82-11042
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053
Testing of a spacecraft model in a combined environment simulator
[NASA-TM-82723] N82-11106
Voltage gradients in solar array cavities as possible breakdown sites in spacecraft-charging-induced discharges
[NASA-TM-82710] N82-11107
Novel improved PMR polyimides
[NASA-TM-82733] N82-11117
Trends in high temperature gas turbine materials
[NASA-TM-82715] N82-11182
Universal binding energy relations in metallic adhesion
[NASA-TM-82706] N82-11183
Failure analysis of a tool steel torque shaft
[NASA-TM-82758] N82-11184
Castable high temperature fractory materials
[NASA-CASE-LEW-13080-2] N82-11210
Fabrication and wear test of a continuous fiber/particulate composite total surface hip replacement
[NASA-TM-81746] N82-11211
Lewis Research Center's coal-fired, pressurized, fluidized-bed reactor test facility
[NASA-TM-81616] N82-11397
High thermal power density heat transfer
[NASA-CASE-LEW-12950-1] N82-11399
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Solar cell development for the power extension package
[NASA-TM-82685] N82-11551

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Concept for a power system controller for large space electrical power systems
[NASA-TP-1939] N82-11109
Thermal control coatings based on trialkoxysilane hydrolysate binders
[NASA-CASE-MFS-25620-1] N82-11118
Static continuous electrophoresis device
[NASA-CASE-MFS-25306-1] N82-11147
Firefighting module development
[NASA-TM-82444] N82-11311
Motor power factor controller with a reduced voltage starter
[NASA-CASE-MFS-25586-1] N82-11360
Method for retarding dye fading during archival storage of developed color photographic film
[NASA-CASE-MFS-23250-1] N82-11432
Clamp-mount device
[NASA-CASE-MFS-25510-1] N82-11470
Space shuttle main engine controller
[NASA-TP-1932] N82-11784

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Fluidized bed coal combustion reactor
[NASA-CASE-NPO-14273-1] N82-11144
Scriber for silicon wafers
[NASA-CASE-NPO-15539-1] N82-11469
Sewage sludge additive
[NASA-CASE-NPO-13877-1] N82-11634
Automatic multi-banking of memory for microprocessors
[NASA-CASE-NPO-15295-1] N82-11785
System for controlled acoustic rotataion of objects
[NASA-CASE-NPO-15522-1] N82-11861

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
Application of a rare-earth cobalt magnet to synchronous motors
[NAL-TR-656] N82-11358
A second-order accurate procedure for solving the boundary layer equations based on the predictor-corrector form of the Crank-Nicolson Scheme
[NAL-TR-655] N82-11826

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
Refracted-ray scanning (refracted near-field scanning) for measuring index profiles of optical fibers
[PB81-224610] N82-11920

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Selected values of chemical thermodynamic properties: Compounds of uranium, protactinium, thorium, actinium, and the alkali metals
[PB81-223463] N82-11170
A compilation of thermodynamic and transport properties of aqueous sulfuric acid
[PB81-229171] N82-11172
Mass spectrometric studies of MHD slag thermochemistry
[PB81-221434] N82-11173
Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177
Application of solidification theory to rapid solidification processing
[AD-A104561] N82-11214
Energy analysis for a sample building by the proposed ASHRAE simplified method
[DE81-027189] N82-11323
Semiconductor measurement technology ARPA/NBS Workshop Moisture Measurement Technology for Hermetic Semiconductor Devices
[PB81-220733] N82-11384
Technical activities of the Office of Environmental Measurements - 1980
[PB81-227860] N82-11677
Semiconductor measurement technology: The relationship between resistivity and dopant density for phosphorus and boron doped silicon
[PB81-221327] N82-11975

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
National Center for Atmospheric Research
[NCAR/AR-80] N82-11692
An analysis of cloud property retrieval using infrared sounder data
[PB81-221608] N82-11732
US Monsoon Experiment MONEX rawinsonde/radiometersonde system
[PB81-222937] N82-11736
The measurement of height and slope of isobaric surfaces with an airborne radar altimeter
[PB81-221632] N82-11739
Search for optimal three-dimensional mapping of the solar corona from K-coronameter data
[PB81-222903] N82-12017
Compressible convection in a rotating spherical shell
[PB81-222895] N82-12018

NATIONAL GEODETIC SURVEY, ROCKVILLE, MD.
A model of temperature stratification for correction of leveling refraction
[PB81-225435] N82-11744

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, EAST LIBERTY, OHIO.
Side impact sled and padding development
[PB81-217952] N82-11092

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, WASHINGTON, D. C.
Third automotive fuel economy research contractors coordination meeting
[PB81-222754] N82-11627

NATIONAL INST. FOR OCCUPATIONAL SAFETY AND HEALTH, CINCINNATI, OHIO.
Evaluation of exhaust emissions data for diesel engines used in underround mines
[PB81-225377] N82-11673
Carbon/graphite fibers: Environmental exposures and potential health implications
[PB81-229692] N82-11780

NATIONAL INST. FOR TRANSPORT AND ROAD RESEARCH, PRETORIA (SOUTH AFRICA).
Writing effective reports
[PB81-214645] N82-11983

NATIONAL INSTITUTES OF HEALTH, BETHESDA, MD.
Energy dispersive X-ray spectrometry: Proceedings of a Workshop on Energy Dispersive X-Ray Spectrometry
[PB81-226334] N82-11177

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
A systems approach to the real-time runoff analysis with a deterministic rainfall-runoff model
[PB81-224495] N82-11530
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 1
[PB81-222762] N82-11737
The estimation of convective, summertime rainfall in the United States high plains from thermal infrared, geostationary satellite imagery, volume 2
[PB81-222770] N82-11738
Instrument intercomparisons at the Boulder Atmospheric Observatory during 1980
[PB81-220139] N82-11740
Doppler radar data analysis during fiscal year 1980
[PB81-225476] N82-11742
Hawaii mesoscale energy and climate project (HAMEC). 2: P-3 aircraft data sets
[PB81-224198] N82-11747
Index to observations of currents in Puget Sound, Washington, from 1908-1980
[PB81-224115] N82-11753

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.
The determination of navigational and meteorological variables measured by NOAA/RFC WP3D aircraft
[PB81-225468] N82-11743

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
Ice conditions in the eastern Bering Sea from NOAA and LANDSAT imagery: Winter conditions 1974, 1976, 1977, 1979
[PB81-220188] N82-11537
Comparison of ocean and island rainfall in the tropical South Pacific, Atlantic, and Indian Oceans
[PB81-225401] N82-11745

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SILVER SPRING, MD.
The wind climatology of American Samoa
[PB81-221012] N82-11733
Workbook for estimating the climatology of regional continental scale atmospheric dispersion and deposition over the United States
[PB81-224172] N82-11748

NATIONAL PHYSICAL RESEARCH LAB., PRETORIA (SOUTH AFRICA).
Guide to the evaluation and use of an atomic absorption spectrophotometer
[PB81-222853] N82-11444
Formulae for the homogeneous isotropic perfectly linear elastic continuum
[PB81-222846] N82-11508

NATIONAL SCIENCE FOUNDATION, WASHINGTON, D. C.
Unique characteristics of financing science in the USSR
[PB81-212243] N82-11980

NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VA.
Microfiche as a vehicle for technical reports
[PB81-228009] N82-11986

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, WASHINGTON, D.C.
User's guide: Voice and data communications protection
[PB81-221509] N82-11356
NATIONAL TRAINING AND DEVELOPMENT SERVICE FOR STATE AND LOCAL GOVERNMENT, WASHINGTON, D.C.
Applying science and technology to improve local government productivity
[PB81-217986] N82-11978
NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH.
A comparison of two methods for forecasting thunderstorms at Luke Air Force Base, Arizona
[PB81-225393] N82-11746
NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
Equipment for flood and flash flood warning systems
[PB81-224131] N82-11749
NATIONAL WEATHER SERVICE, WASHINGTON, D.C.
Climate Diagnostics Workshop (5th) annual proceedings
[PB81-222200] N82-11735
NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Remote Medical Diagnosis System RMDS design review meeting minutes
[AD-A104555] N82-11772
NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069
Determining the training effectiveness and cost-effectiveness of visual flight simulators for military aircraft
[AD-A104627] N82-11091
The effects of jet exhaust blast impingements on graphite-epoxy composites
[AD-A104622] N82-11136
Fatigue characteristics and microstructural analysis of thermomechanically-processed, high-magnesium aluminum-magnesium alloy
[AD-A104589] N82-11189
An investigation of the combustion process in solid fuel ramjets
[AD-A104603] N82-11232
Fourier analysis of broadband, low-level signals using switched inputs
[AD-A104588] N82-11353
Investigation of heat transfer in straight and curved rectangular ducts for laminar and transition flows
[AD-A104604] N82-11401
Relationships between synoptic storm activity and sea surface temperature anomalies over the North Pacific Ocean
[AD-A104590] N82-11727
Tropical storm movement based on synoptic map typing using empirical orthogonal functions
[AD-A104591] N82-11728
An open-ocean marine fog development and forecast model for Ocean Weather Station Papa
[AD-A104595] N82-11729
Computer performance prediction of a data flow architecture
[AD-A104587] N82-11792
A microprocessor development system for the ALTOS series microcomputers
[AD-A104624] N82-11793
Elements of programming linguistics. Part 1: The lambda calculus and its implementation
[AD-A104345] N82-11805
Condition recognition for a program synthesizer
[AD-A104586] N82-11808
Programming with a relational calculus
[AD-A104650] N82-11809
Constrained adaptive least mean squared filters
[AD-A104625] N82-11830
A simulation analysis of the effectiveness of Markovian control and Bayesian control
[AD-A104635] N82-11840
The individual versus the computer: An examination of attitude problems and their impact on system development
[AD-A104636] N82-11977
NAVAL RESEARCH LAB., WASHINGTON, D. C.
Estimation of radar range biases at multiple sites
[AD-A104306] N82-11346
Quiet bearing surface characterization
[AD-A104412] N82-11472
Architecture tuning of a real-time signal sorter in a dense environment
[AD-A104524] N82-11787
Validation of a Monte Carlo simulation of binary time series
[AD-A104525] N82-11838
On electron beam ionization of air and chemical reactions for disturbed air deionization
[AD-A104517] N82-11871
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.
Outgassing of two synthetic fuels
[AD-A104580] N82-11231
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
A back-end data management experiment
[AD-A104579] N82-11794
NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212
Estimates for the probabilities of surface-to-air cloud-free lines-of-sight and low cloud statistics from ship observations. Part 1: Fifteen marine locations
[AD-A104633] N82-11730
The Crosstie Random Access Memory (CRAM). Part 1: The concept and initial studies
[AD-A104543] N82-11788
NEBRASKA UNIV. - LINCOLN.
Vector integrals and products of vector measures
N82-11847
The hydrogen atom in a strong uniform magnetic field N82-11866
NEVADA POWER CO., LAS VEGAS.
Magma Cooling-Tower process pilot-plant demonstration
[DE81-903783] N82-11406
NEVADA UNIV., BOULDER CITY.
Analysis of saturated solar pond characteristics, volume 1
[DE81-030820] N82-11618
NEW HAMPSHIRE UNIV., DURHAM.
Conditional sampling of oceanic temperature and pressure
[AD-A104539] N82-11751
NEW MEXICO UNIV., ALBUQUERQUE.
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY, NEW YORK.
Low/medium-Btu coal-gasification assessment program for specific sites of two New York utilities
[DE81-025518] N82-11240
NORTH CAROLINA STATE DEPT. OF TRANSPORTATION, RALEIGH.
Evaluation of base courses for flexible pavements
[PB81-218372] N82-11329
NORTH CAROLINA STATE UNIV. AT RALEIGH.
Evaluation of base courses for flexible pavements
[PB81-218372] N82-11329
NORTH CAROLINA STATE UNIV., RALEIGH.
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039
NORTH CAROLINA UNIV. AT CHAPEL HILL.
New approaches to quantitating the pulmonary effects on inhaled pollutants
[PB81-222382] N82-11778
NORTHEASTERN UNIV., BOSTON, MASS.
Control and data transmission system for a balloon-borne ion mass spectrometer
[AD-A104512] N82-11438
NORTHERN RESOURCES, INC., BILLINGS, MONT.
Feasibility and economic study of medium-BTU coal gas blended with high-BTU by product gas as an industrial energy source at Billings, Montana
[DE81-025166] N82-11237
NORTHROP SERVICES, INC., HUNTSVILLE, ALA.
Space shuttle solid rocket booster sting interference wind tunnel test analysis
[NASA-CR-161885] N82-11040
NUCOR CORP., DENVILLE, N. J.
Detection of oil in water by a flame emission technique
[PB81-226185] N82-11178

O

OAK RIDGE NATIONAL LAB., TENN.
Tennessee Valley Authority atmospheric fluidized-bed combustor simulation
[DE81-030262] N82-11151
Scientific innovation and resonance ionization spectroscopy
[DE81-023193] N82-11157
Electron attachment as a probe of photoionization processes in liquid media
[DE81-026352] N82-11163
Assessment of building diagnostics
[DE81-027078] N82-11321
Assessment of roofing research
[DE81-027077] N82-11322
Cycle and performance analysis of absorption heat pumps for waste heat utilization
[DE81-030705] N82-11405
Portable transfer standards for pressure and gas flow measurements
[DE81-024445] N82-11409
Stefan problem with a convective boundary condition
[DE81-030424] N82-11410
Computer-aided heat-pump design and optimization
[DE81-024965] N82-11415
Laboratory determination of frosting and defrosting losses for a high efficiency air-source heat pump
[DE81-023218] N82-11416
Alternative heat pump cycle studies
[DE81-024983] N82-11417
Conduct a state-of-the-art survey of existing knowledge for the design of ground-source heat pumps
[DE81-024084] N82-11420
Heat pump R and D at Oak Ridge National Laboratory
[DE81-024121] N82-11422
Liquid-particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[DE81-024075] N82-11429
Calibration of a laminar flowmeter: The data and correlations
[DE81-025227] N82-11441
Calibration of a laminar flowmeter
[DE81-024423] N82-11442
Data collection and processing for the ACES
[DE81-030630] N82-11555
Energy analysis of human ecosystems in an Appalachian coal county
[DE81-025177] N82-11574
Geothermal heat transfer, district heating and cooling
[DE81-023195] N82-11587
Ocean thermal energy conversion gas-desorption studies. Volume 2: Deaeration in a packed column and a barometric intake system
[DE81-030469] N82-11619
Meteorological Effects of Thermal Energy Releases (METER) program
[DE81-030431] N82-11640
Trace-element and phase relations in fly ash
[DE81-028555] N82-11643
DARTAB: A program to combine airborne radionuclide environmental exposure data with dosimetric and health effects data to generate tabulations of predicted health impacts
[DE81-030434] N82-11774
Altered tissue reactivity and interactions between chemicals
[DE81-023189] N82-11777
Estimation problems associated with the Weibull distribution
[DE81-030466] N82-11841
Sensitivity theory for nonlinear systems. 2: Extensions to additional classes of responses
[DE81-030258] N82-11845
Ion-reversibility studies in amorphous solids using the two-atom scattering model
[DE81-025188] N82-11886
International safeguards for spent fuel storage
[DE81-029896] N82-11892
Materials considerations relative to multibarrier waste isolation
[DE81-029104] N82-11894
Engineering challenges of fusion-reactor development
[DE81-024129] N82-11907

Plasma assessments for the Fusion Engineering Device (FED)
[DE81-024254] N82-11948

Calculation procedures for the analysis of integral experiments for fusion-reactor design
[DE81-027626] N82-11949

Physics considerations for the FED limiter
[DE81-027596] N82-11950

Decay heat curve evaluation test
[DE81-027181] N82-11976

OAK RIDGE Y-12 PLANT, TENN.

Surface analysis by Fourier transform infrared (Ftir) spectroscopy
[DE81-025741] N82-11150

Digital control of machine tools
[DE81-029950] N82-11476

OAO CORP., HAMPTON, VA.

Technology transfer of NASA microwave remote sensing system
[NASA-CR-165791] N82-11515

OFFICE OF RADIATION PROGRAMS, LAS VEGAS, NEV.

Airborne radiological sampling of Mount St. Helens plumes
[PB81-213795] N82-11659

OHIO RIVER BASIN COMMISSION, CINCINNATI.

Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269

Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270

OHIO STATE UNIV., COLUMBUS.

Development and optimization of methodologies for analysis of complex hydrocarbon mixtures
[DE81-025875] N82-11114

Design and analysis of a multi-backend database system for performance improvement, functionality expansion and capacity growth, part 2
[AD-A104445] N82-11790

OKLAHOMA DEPT. OF TRANSPORTATION, OKLAHOMA CITY.

Bearing capacity and characterization of compressible Clayey and Silty Foundation soils in Oklahoma
[PB81-231607] N82-11330

OLD NORTH MFG. CO., INC., LENOIR, N.C.

SOL-CYCLE: A solar-assisted solvent-recycling process for asphalt-impregnation of fiber board
[DE81-903377] N82-11615

OREGON UNIV., EUGENE.

Far-infrared measurements of trace gases
[NASA-CR-164965] N82-11698

OWENS-ILLINOIS, INC., TOLEDO, OHIO.

Antireflecting film development
[DE81-030010] N82-11915

OXFORD UNIV. (ENGLAND).

A model of the normal and null states of pulsars
[PB81-215907] N82-12011

P

PACIFIC ENVIRONMENTAL SERVICES, INC., ELMHURST, ILL.

Industrial process fugitive emissions inventory for the Region V Great Lakes shoreline
[PB81-212037] N82-11658

PACIFIC GAS AND ELECTRIC CO., SAN RAMON, CALIF.

Research to develop guidelines for cathodic protection of concentric neutral cables, volume 1
[DE81-904195] N82-11382

Research to develop guidelines for cathodic protection of concentric neutral cables, volume 2
[DE81-904210] N82-11383

PANAMETRICS, INC., WALTHAM, MASS.

Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063

PEDCO-ENVIRONMENTAL, INC., CINCINNATI, OHIO.

EPA utility FGD (Flue Gas Desulfurization) survey
[PB81-225773] N82-11679

FGDIS primer: Major equipment/component classifications, problem/solution access codes, and definitions related to FGD systems as contained in the Flue Gas Desulfurization Information System (FGDIS)
[PB81-225948] N82-11985

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.

Analytical and experimental study of flow phenomena in noncavitating rocket pump inducers
[NASA-CR-3471] N82-11031

Innovative technology for fabrication of ceramics: EDS rapid solidification process application to specialized materials
[PB81-214868] N82-11222

Correcting for the sidewall boundary layer in subsonic two-dimensional airfoil/hydrofoil testing
[AD-A104562] N82-11402

Frontogenesis in the planetary boundary layer of an amplifying, two-dimensional baroclinic wave
N82-11721

Numerical studies of hurricane-ocean interactions
[PB81-225575] N82-11741

Airway gas mixing during rest and bicycle exercise
N82-11768

Computer processing of periodic electron micrographs N82-11815

Nonclassical orthogonal polynomials and differential equations N82-11823

A new method for measuring the acoustic impedance of the ground N82-11856

An experimental investigation of ocean sediment effects upon long range transmission loss in shallow water N82-11857

PERFORMANCE DEVELOPMENT INST., WASHINGTON, D.C.

Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 6: Innovation by regulation: The administration of control technology requirements under the Clean Air Act
[PB81-221616] N82-11664

Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 7: Periodic review and technological escalation of performance standards: New source performance standards review process
[PB81-218117] N82-11665

Incentives for technological innovation in air pollution reduction: An ETIP policy research series. Volume 8: Controlled trading and site-specific SIP revisions: Competing for attention in a crowded administrative route
[PB81-218273] N82-11666

PERKIN-ELMER CORP., DANBURY, CONN.

Development of MBE grown Pb-salt semiconductor lasers for the 8.0 to 15.0 micrometer spectral region
[NASA-CR-165883] N82-11453

PHOTOMETRICS, INC., WOBURN, MASS.

The use of DMSP digital data for auroral measurements
[AD-A104392] N82-11707

PITTSBURG AND MIDWAY COAL MINING CO., ENGLEWOOD, COLO.

Solvent-Refined-Coal (SRC) process
[DE81-029628] N82-11268

PITTSBURG ENERGY TECHNOLOGY CENTER, PA.

Soot formation in synfuels
[DE81-030273] N82-11164

Transport characteristics of alternate slurry fuels
[DE81-028580] N82-11255

PITTSBURG UNIV., PA.

Well-water-source heat pump field performance study
[DE81-024136] N82-11419

POLYTECHNIC INST. OF NEW YORK, BROOKLYN.

The stability of new transparent polymeric materials: The epoxy trimethoxyboroxine system. Part 1: The preparation, characterization and curing of epoxy resins and their copolymers
[NASA-CR-164951] N82-11208

POLYTECHNIC INST. OF NEW YORK, FARMINGDALE.

One-dimensional equilibrium-chemistry flow model for coal combustors
[DE81-027622] N82-11158

POTOMAC ELECTRIC POWER CO., WASHINGTON, D.C.

Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 8: Design approaches: UPH
[DE81-030673] N82-11620

Preliminary design study of underground pumped hydro and compressed-air energy storage in hard rock. Volume 9: Design approaches: CAES, appendix C. Major mechanical equipment
[DE81-030672] N82-11621

PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.

An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

JT8D high pressure compressor performance improvement
[NASA-CR-165531] N82-11467

PRINCETON UNIV., N. J.

An introduction to stochasic optimal control theory
N82-11076

Magneto-optically modulated CH3OH laser for Faraday rotation measurements in Tokamaks
[DE81-027298] N82-11462

Is geothermal simulation a catastrophe?
[DE81-026750] N82-11588

Geochemical controls on trace metal transport in aqueous environmental systems N82-11631

PURDUE UNIV., LAFAYETTE, IND.

Control design of flexible spacecraft N82-11081

Properties of batch means from stationary ARMA (1, 1) time series
[AD-A104245] N82-11839

R

R AND D ASSOCIATES, MARINA DEL REY, CALIF.

A ground-motion displacement gauge
[AD-A104325] N82-11437

RADIAN CORP., AUSTIN, TEX.

Response of portable VOC analyzers to chemical mixtures
[PB81-234262] N82-11176

RASOR ASSOCIATES, INC., SUNNYVALE, CALIF.

Jet impingement heat transfer enhancement for the GPU-3 Stirling engine
[NASA-TM-82727] N82-11993

RCA LABS., PRINCETON, N. J.

InGaAsP/InP laser development for single-mode, high-data-rate communications
[NASA-CR-3477] N82-11452

Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027234] N82-11557

Amorphous boron-silicon-hydrogen alloys for thin-film heterojunction solar cells
[DE81-027254] N82-11558

RENSSELAER POLYTECHNIC INST., TROY, N. Y.

Parameter estimation of large flexible aerospace structures with application to the control of the Maypole Deployable Reflector
[NASA-CR-164971] N82-11099

Liquid and solid metal embrittlement
[AD-A103048] N82-11187

Effects of ionizing radiation on the chemical structure, crystalline content and molecular weight distribution of various Teflon resins N82-11203

The Rogers focusing heliostat experimental program at Rensselaer Polytechnic Institute
[PB81-226813] N82-11625

Mechanistic analysis of loft pulsed neutron activation data
[DE81-027124] N82-11876

Low temperature growth and electrical characterization of insulators for GaAs MISFETS
[NASA-CR-164972] N82-11959

Observations of molecular clouds containing reflection nebulae N82-11999

RESEARCH AND DATA SYSTEMS, INC., LANHAM, MD.

SMMR data set development for GARP
[NASA-CR-166721] N82-11512

Thermal algorithms analysis
[NASA-CR-166716] N82-11800

RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N. C.
Coal gasifier parameters influencing environmental pollutant production
[PB81-221301] N82-11273
Assessment of hazard potential from combustion of wastes in industrial boilers
[PB81-221889] N82-11656
Vapor-phase cracking and wet oxidation as potential pollutant control techniques for coal gasification
[PB81-219594] N82-11661

RHODE ISLAND UNIV., KINGSTON.
Planning a comprehensive program for exploration of the anthracite deposits of the Narragansett Basin of Massachusetts and Rhode Island, phase 1 and 2
[DE81-028490] N82-11519

ROCHESTER UNIV., N. Y.
Human lymphocyte calcium metabolism
N82-11769
Laser excitation of surface electronic states for a one-dimensional semiconductor
[AD-A104522] N82-11964

ROCKETDYNE, CANOGA PARK, CALIF.
Advanced superposition methods for high speed turbopump vibration analysis
[NASA-CR-165379] N82-11465
Liquid oxygen turbopump technology
[NASA-CR-165487] N82-11468

ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.
Vibration signature analysis and acoustic-emission monitoring at Brayton Point
[DE81-904232] N82-11507

ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.
Cavity-backed, micro-strip dipole antenna array
[NASA-CASE-MSC-18606-1] N82-11336

ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Automation of electron diffraction analysis in an analytical electron microscope
[DE81-027255] N82-11159

ROCKWELL INTERNATIONAL SCIENCE CENTER, THOUSAND OAKS, CALIF.
Theoretical and experimental studies of the electro-optic effect: Toward a microscopic understanding
[AD-A104363] N82-11961

ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
Effect of energetic particle events on VLF/LF propagation parameters, 1974 - 1977
[AD-A104508] N82-11344
A comparison of weighting techniques for SAW transducers at UHF
[AD-A104510] N82-11362

ROYAL AIRCRAFT ESTABLISHMENT, BEDFORD (ENGLAND).
The comparison between the unsteady pressure fields calculated and measured on the ZKP model
[RAE-LIB-TRANS-2061] N82-11029
Some features of flow past slotted wings
[RAE-LIB-TRANS-2050] N82-11030
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089
The quantitative determination of non-metallic inclusions by a mathematical statistical method
[RAE-LIB-TRANS-2066] N82-11179
The effect of surface treatment of carbon fibres on the strength properties of carbon-reinforced plastics
[RAE-LIB-TRANS-2052] N82-11205
Determination of the spectra of modulated pulse trains by the spectral function method
[RAE-LIB-TRANS-2058] N82-11335
Some problems in the calculation of flows with tangential discontinuities
[RAE-LIB-TRANS-2059] N82-11389
Strength behaviour of fatigue cracked lugs
[RAE-LIB-TRANS-2057] N82-11486
Fatigue initiation at a high or low number of cycles
[RAE-LIB-TRANS-2056] N82-11487
On the active part played by the heart in the venous return of the blood
[RAE-LIB-TRANS-2017] N82-11766
Mechanical impedance of the human outer ear
[RAE-LIB-TRANS-2065] N82-11767

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
Design considerations for optimal flight control systems N82-11077

ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, OSLO.
Plan for technological research and development related to the petroleum activities on the Norwegian Continental Shelf. 1981-1985: Appendixes: 1. Technical challenges. 2. Research requirements. 3. High priority programs
[DE81-904014] N82-11520

RUTGERS - THE STATE UNIV., NEW BRUNSWICK, N. J.
Nitrogen dynamics in a lagoon development and an adjacent salt marsh N82-11632
Characters of rank two hyperbolic Lie algebras as functions at quasiregular cusps N82-11821
Ionization fluctuations in collisional ionizing shock waves N82-11864

S

SANDIA LABS., ALBUQUERQUE, N. MEX.
Wind ripple analysis
[DE81-030129] N82-11044
Shock-induced organic chemistry
[DE81-024442] N82-11115
Shock compression of beryllium
[DE81-024062] N82-11200
Trapping and surface permeation of deuterium in Fe, Ni and stainless steel: An ion-beam study
[DE81-023303] N82-11201
Trap activation model for hydrogen retention and isotope exchange in some refractory materials
[DE81-025995] N82-11221
Deflagration-to-Detonation Transition (DDT) project
[DE81-030979] N82-11241
Hot-spot initiation of heterogeneous explosives
[DE81-027801] N82-11266
High-voltage air-core pulse transformers
[DE81-030999] N82-11370
Modeling and elimination of latch-up in bulk CMOS integrated circuits
[DE81-017413] N82-11377
Transient temperature response of strain gages
[DE81-031922] N82-11440
Stimulated Raman studies of CO2-laser-excited SF6
[DE81-025829] N82-11463
Analyses of ductile flow and fracture in two dimensions
[DE81-023651] N82-11506
Heliostat operation at the central receiver test facility (1978 - 1980)
[DE81-031926] N82-11556
Second generation heliostat program, September 1979-March 1981
[DE81-029752] N82-11570
Non-solar power tests at the Central Receiver Test Facility (CRTF)
[DE81-026955] N82-11604
Performance testing of the TOLTEC TI-410 concentrating solar collector
[DE81-029994] N82-11617
Environmental Monitoring Report, Sandia National Labs., Albuquerque, New Mexico, 180
[DE81-027839] N82-11649
Recovery of seismic signals in noise by adaptive processing
[DE81-029469] N82-11713
Evaluation of uncertainties in geologic information
[DE81-025997] N82-11714
Use of a hybrid computer for the flight simulation of a bomb/parachute system
[DE81-025141] N82-11797
Constitutive modelling for the shock physicist
[DE81-024063] N82-11854
Modular accelerator interconnecting and operating systems for PBFA-1
[DE81-025397] N82-11887
Uncertainty analysis for geologic disposal of radioactive waste
[DE81-027206] N82-11893
Considerations for the design, implementation, and effective operation of Sandia's super-power generators
[DE81-025404] N82-11908
Coated-limiter testing in Tokamaks
[DE81-027665] N82-11951
Shock effects in particle-beam fusion targets
[DE81-027806] N82-11952
Scalability of light ion beams to reach fusion conditions
[DE81-024443] N82-11953
Trapping and release of implanted D/H ions in fused silica
[DE81-024441] N82-11974

SANDIA LABS., LIVERMORE, CALIF.
Microcomputer-controlled communication network for Sandia National Laboratories' environmental test chambers
[DE81-030988] N82-11355
Second generation heliostat, volume 1
[DE81-029618] N82-11564
Second generation heliostat. Volume 2: Definition of a heliostat manufacturing facility
[DE81-029824] N82-11565
Study of photovoltaic cost elements. Volume 1: Executive report. Volume 2: Project background
[DE81-030982] N82-11566
Study of photovoltaic cost elements. Volume 3: Sandia National Laboratories photovoltaic systems design catalog
[DE81-030986] N82-11567
Study of photovoltaic cost elements. Volume 4: Installation cost model for residential PV systems: Users manual
[DE81-031921] N82-11568
Study of photovoltaic cost elements. Volume 5: Installation cost model for intermediate PV systems: Users manual
[DE81-030981] N82-11569
Second generation heliostat program, September 1979-March 1981
[DE81-029752] N82-11570
Design, cost and performance comparisons of several solar thermal systems for process heat. Volume 1: Executive summary
[DE81-029881] N82-11576

SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
Optoacoustic spectroscopy to detect hydrazine fuels
[AD-A104675] N82-11229

SCIENCE APPLICATIONS, INC., BELLEVUE, WASH.
Ice conditions in the eastern Bering Sea from NOAA and LANDSAT imagery: Winter conditions 1974, 1976, 1977, 1979
[PB81-220186] N82-11537

SCIENCE APPLICATIONS, INC., BOULDER, COLO.
Magnetic fusion energy program, volume 1
[SAI-254-80-656-LJ-VOL-1] N82-11955
Magnetic fusion energy program, volume 2
[SAI-254-80-656-LJ-VOL-2] N82-11956

SCIENCE APPLICATIONS, INC., MCLEAN, VA.
Parametric sensitivity study for solar-assisted heat-pump systems
[DE81-030309] N82-11407
Identification of geopressured occurrences outside of the Gulf Coast
[DE81-025511] N82-11522

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.
Measurements of aerosol size distribution in the lower troposphere over northern Europe
[AD-A104272] N82-11637

SHD ASSOCIATES, INC., EVANSTON, ILL.
Surface-tension induced instabilities: Effects of lateral boundaries
[NASA-CR-165530] N82-11390

SHEFFIELD UNIV. (ENGLAND).
Content representation for retrieval
[PB81-170672] N82-11984

SINGER CO., BINGHAMTON, N.Y.
Reliability and maintainability assessment report for laser scanner image generation system, revision A
[AD-A104239] N82-11455

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.
Study of the time evolution of the lithosphere
[NASA-CR-164968] N82-11696
Theoretical studies of chromospheres and winds in cool stars
[NASA-CR-164969] N82-12004

SOUTH AFRICAN BUREAU OF STANDARDS, PRETORIA.
Standard specification for light ladders
[SABS-1304-1980] N82-11277
Standard specification for industrial safety-belt assemblies
[SABS-809-1980] N82-11278
Standard specification for apparatus for gamma radiography
[SABS-1317-1980] N82-11433
Standard specification for air-brake reservoirs
[SABS-1312-1980] N82-11464
SOUTH CAROLINA ENERGY RESEARCH INST., COLUMBIA.
Residual-energy-applications program: EAST-facility requirements document
[DE81-027489] N82-11616
SOUTH CAROLINA UNIV., COLUMBIA.
Use of polyethers in the treatment of acidic high-activity nuclear wastes
[DE81-027087] N82-11895
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, BROOKSVILLE.
Ground-water hydrology of the Dade City area, Pasco County, Florida, with emphasis on the hydrologic effects of pumping from the Floridan aquifer
[PB81-225518] N82-11529
SPIRE CORP., BEDFORD, MASS.
Processing of silicon solar cells by ion implantation and laser annealing
[NASA-CR-165283] N82-11546
SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Improved simulation of aerosol, cloud, and density measurements by shuttle lidar
[NASA-CR-3473] N82-11688
ALTAIR radar study of equatorial spread F
[AD-A104554] N82-11710
OBJ-1: A study in executable algebraic formal specification
[AD-A104468] N82-11803
STANFORD LINEAR ACCELERATOR CENTER, CALIF.
Projection pursuit methods for data analysis
[DE81-027493] N82-11842
Oxide effects on photoemission from high current GaAs photocathodes
[DE81-025129] N82-11972
STANFORD UNIV., CALIF.
An overview of optimal control in aerospace systems N82-11074
Algorithm for computing in-situ combustion oil recovery performance
[DE81-030340] N82-11153
A three-dimensional simulation of transition and early turbulence in a time-developing mixing layer
[NASA-CR-164942] N82-11393
Mixing of a passive scalar in isotropic and sheared homogeneous turbulence
[NASA-CR-164938] N82-11394
Higher-level simulations of turbulent flows
[NASA-CR-164936] N82-11395
Numerical simulation of a compressible homogeneous, turbulent shear flow
[NASA-CR-164953] N82-11396
Feasible objective confidence bounds for system reliability
[AD-A104260] N82-11483
Integrating medical knowledge and clinical data banks: Discovery and representation of causal relationships from a large time-oriented clinical database. The RX project
[PB81-227233] N82-11987
STATE UNIV. OF NEW YORK AT ALBANY.
Site selection for small wind energy conversion systems for US Department of Energy field evaluation program
[PB81-226662] N82-11624
STATE UNIV. OF NEW YORK AT BUFFALO.
Temperature measurement in turbulent arcs N82-11921
STATE UNIV. OF NEW YORK AT STONY BROOK.
A geochemical and sedimentological study of the dredged material deposit in the New York Bight
[PB81-224107] N82-11669
STONEHART ASSOCIATES, INC., MADISON, CONN.
Survey on aging on electrodes and electrocatalysts in phosphoric acid fuel cells
[NASA-CR-165505] N82-11545
SUSQUEHANNA RIVER BASIN COMMISSION, HARRISBURG, PA.
Flow routing in the Susquehanna River Basin: Part 4 - routing reservoir releases in the eastern Susquehanna River Basin in New York State
[PB81-221533] N82-11533
SYDNEY UNIV. (AUSTRALIA).
A review of the behaviour and engineering properties of carbonate soils
[PB81-226722] N82-11331
SYRACUSE RESEARCH CORP., N. Y.
Three prototype designs for an exterior-mounted, interior-operated, movable insulation system
[DE81-025586] N82-11324
SYSTEMS AND APPLIED SCIENCES CORP., RIVERDALE, MD.
Antenna pattern modification for single reflector antennas
[NASA-CR-166711] N82-11338
SYSTEMS CONTROL, INC., PALO ALTO, CALIF.
Development of multivariable controllers for aircraft turbine engines N82-11087

T

TELEDYNE BROWN ENGINEERING, HUNTSVILLE, ALA.
Investigation of direct solar-to-microwave energy conversion techniques
[NASA-CR-161883] N82-11544
TELEDYNE CONTINENTAL MOTORS, MUSKEGON, MICH.
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068
TELEDYNE ENERGY SYSTEMS, TIMONIUM, MD.
Advanced selenide thermoelectric development program
[DE81-027823] N82-11562
TENNESSEE DEPT. OF CONSERVATION, NASHVILLE.
Water resources data for Tennessee, water year 1979
[PB81-228249] N82-11539
TENNESSEE VALLEY AUTHORITY, KNOXVILLE.
Water resources data for Tennessee, water year 1979
[PB81-228249] N82-11539
TEXAS INSTRUMENTS, INC., DALLAS.
Binary/analog CCD correlator development
[AD-A104438] N82-11363
R&D services to develop an improved isolation technology radiation hardened bipolar integrated circuits (PEDIC)
[AD-A104657] N82-11367
TEXAS RESEARCH INST., INC., AUSTIN.
Investigation of the strength of shielded and unshielded underwater electrical cables
[AD-A104314] N82-11364
TEXAS UNIV. AT ARLINGTON.
Modal analysis using a Fourier analyzer, curve-fitting, and modal tuning
[NASA-CR-161886] N82-11490
Crustal deformation and seismic measurements in the region of McDonald Observatory, West Texas
[NASA-CR-164964] N82-11695
TEXAS UNIV. AT AUSTIN.
Ion thermal conductivity for a pure Tokamak plasma
[DE81-029710] N82-11932
TOLEDO UNIV., OHIO.
Photoelectric surface brightness observations and the geometry of reflection nebulae N82-12002
TOWER SYSTEMS, INC., TACOMA, WASH.
Magma Cooling-Tower process pilot-plant demonstration
[DE81-903783] N82-11406
TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CALIF.
Radiation testing of composite materials, in situ versus ex situ effects
[NASA-CR-3475] N82-11116
TRW, INC., MCLEAN, VA.
Gas recovery from coal deposits
[PB81-222291] N82-11271
Environmental research plan for gas supply technologies. Volume 2: Environmental research plan
[PB81-222317] N82-11274
Environmental research plan for gas supply technologies. Volume 1: Executive summary
[PB81-222309] N82-11657
TRW, INC., REDONDO BEACH, CALIF.
Laboratory study for removal of organic sulfur from coal
[DE81-025132] N82-11239
TUFTS UNIV., MEDFORD, MASS.
Studies for the stabilization of coal-oil mixtures
[DOE/ET-10746/T1] N82-11156

U

UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Development of prediction method for transonic shock induced separated flow
[AD-A104566] N82-11403
Helicopter rotor trailing edge noise
[NASA-CR-3470] N82-11859
UNIVERSITE CATHOLIQUE DE LOUVAIN (BELGIUM).
Theory of stochastic optimal control some basic notions N82-11075
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
The planning and management of California's coastal resources
[PB81-224057] N82-11670
Wave propagation over rectangular trench
[PB81-220782] N82-11752
UTAH STATE UNIV., LOGAN.
Proof of concept study
[AD-A104338] N82-11639
UTAH UNIV., SALT LAKE CITY.
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/1] N82-11259
Chemistry and catalysis of coal liquefaction: Catalytic and thermal upgrading of coal liquid and hydrogenation of CO to produce fuels
[DOE/ET-14700/2] N82-11260

V

VANDERBILT UNIV., NASHVILLE, TENN.
Homeomorphisms of some direct limit spaces N82-11848
VARTA BATTERIE A.G., KELKHEIM (WEST GERMANY).
Recent advances in lead-acid cell research and development
[DE81-023104] N82-11580
VIRGINIA HIGHWAY AND TRANSPORTATION RESEARCH COUNCIL, CHARLOTTESVILLE.
Jointless bridges
[PB81-227738] N82-11332
VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Optical fiber interferometer for the study of ultrasonic waves in composite materials
[NASA-CR-164916] N82-11121
Optical fiber interferometer for the study of ultrasonic waves in composite materials, discussion N82-11122
Detection of acoustic emission in composites by optical fiber interferometry N82-11125
Pulsed-echo interface wave characterization of bolted plates N82-11126
Attenuation of ultrasonic interface waves on metal-polymer-metal boundaries N82-11127
Characterization of metal-polymer boundaries using Stoneley and Leaky waves N82-11128
Waves guided by a thin viscoelastic layer between elastic solids N82-11129
An ultrasonic transducer with Gaussian radial velocity distribution N82-11130
Optical detection of pulsed surface particle displacements N82-11131
Dual differential interferometer for measurements of broadband surface acoustic waves N82-11133
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-029125] N82-11166
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE81-025961] N82-11167

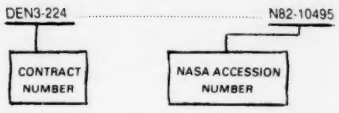
W

WASHINGTON STATE UNIV., PULLMAN.
Multiple-instruction, multiple-data path computers: Parallel processing impact on flight simulation software
[AD-A104506] N82-11789
Light scattering by bubbles in liquids or in glass
[AD-A104241] N82-11912
WASHINGTON UNIV., SEATTLE.
Physical studies of aromatic methylenes N82-11113
Identification of lithologic units using multichannel imaging systems N82-11509
Effects of planform geometry on tidal flushing and mixing in Marinas
[PB81-219537] N82-11660
Adaptation of land use to surficial geology in metropolitan Washington, D.C. N82-11718
Numerical simulation of the dynamics, cloud microphysics and radar echo structures of tropical and mid-latitude convection N82-11722
On the computation of barotropic tides in deep estuaries with application to Knight Inlet, British Columbia
[PB81-220147] N82-11754
Time dependent mixing in a salt wedge estuary N82-11755
An inverse technique for determination of mean ocean circulation N82-11756
Multilinear pseudodifferential operators and paraproducts N82-11825
Vibrational spectra and atom-atom potentials in the crystalline state. 1: A comparison of hexasulfur, octasulfur and dodecasulfur. 2: A study of solid allene N82-11957
The Bogoliubov transformation and its application to cosmological particle production N82-12009
WASHINGTON UNIV. TECHNOLOGY ASSOCIATES, INC., ST. LOUIS, MO.
Yawing of wind turbines with blade cyclic pitch variation
[DE81-030091] N82-11045
WATER AND POWER RESOURCES SERVICE, DENVER, COLO.
Impinging jets
[PB81-227902] N82-11392
WATER RESOURCES COUNCIL, WASHINGTON, D.C.
Coal liquefaction demonstration plant near Morgantown, West Virginia; water assessment report section 13(b)
[PB81-216095] N82-11269
Coal liquefaction demonstration plant near Morgantown, West Virginia: Water assessment report
[PB81-216103] N82-11270
Great Plains gasification project, Mercer County, North Dakota; water assessment report section 13(c)
[PB81-216111] N82-11524
Great Plains gasification project, Mercer County, North Dakota; water assessment report
[PB81-216129] N82-11525
WENTWORTH INST., BOSTON, MASS.
Design and fabrication of quadrupole ion mass spectrometer for upper atmosphere
[AD-A104319] N82-11705
WESTINGHOUSE ELECTRIC CORP., LINTHICUM HEIGHTS, MD.
ATS-5 12 year in orbit evaluation
[NASA-CR-166728] N82-11101
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Lightweight concrete materials and structural systems for water tanks for thermal storage
[COO-4703-26] N82-11501
Development, testing, and evaluation of MHD materials and component designs. Volume 1: Executive summary
[DE81-026203] N82-11947
WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Design of refractories for resistance to high-temperature erosion-corrosion
[DE81-904208] N82-11217
Acoustic waveguide technique for sensing incipient faults in underground power-transmission cables: Including acousto-optic techniques
[DE81-029626] N82-11381
WISCONSIN CENTER FOR PUBLIC POLICY, MADISON.
SOLPLAN report: An assessment of barriers and incentives to conservation and alternative-energy use in the residential sector in Wisconsin
[DOE/CS-30292/3] N82-11614
WISCONSIN UNIV. - MADISON.
Recent advances in statistical methods for system reliability using Bernoulli sampling of components
[AD-A104436] N82-11482
WISCONSIN UNIV., MADISON.
Magnets for the Tandem Mirror Fusion Power Reactor WITAMIR-I
[DE81-025568] N82-11954
WYOMING UNIV., LARAMIE.
Performance assessments of precipitation gages for snow measurement
[PB81-218547] N82-11443

Y

YALE UNIV., NEW HAVEN, CONN.
Large gain, negative resistance, and oscillations in superconducting quasiparticle heterodyne mixers
[AD-A104534] N82-11361

Typical Contract Number Index Listing



Listings in this index are arranged alpha-numerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. 2003 ..... N82-11062
AF PROJ. 2301 ..... N82-11454
AF PROJ. 2303 ..... N82-11216
AF PROJ. 2305 ..... N82-11343
N82-11347
N82-11362
N82-11366
AF PROJ. 2306 ..... N82-11135
N82-11965
AF PROJ. 2310 ..... N82-11438
N82-11639
N82-11702
N82-11706
N82-11707
AF PROJ. 2311 ..... N82-11699
AF PROJ. 2338 ..... N82-11104
N82-11963
AF PROJ. 2403 ..... N82-11048
AF PROJ. 2418 ..... N82-11496
AF PROJ. 2480 ..... N82-11228
AF PROJ. 2528 ..... N82-11804
AF PROJ. 3145 ..... N82-11072
AF PROJ. 3204 ..... N82-11711
AF PROJ. 3326 ..... N82-11457
AF PROJ. 4600 ..... N82-11344
N82-11363
N82-11367
AF PROJ. 4643 ..... N82-11700
AF PROJ. 5730 ..... N82-11112
AF PROJ. 6114 ..... N82-11789
AF PROJ. 6670 ..... N82-11726
AF PROJ. 6687 ..... N82-11689
N82-11705
AF PROJ. 6690 ..... N82-11703
AF PROJ. 7601 ..... N82-11701
AF PROJ. 7661 ..... N82-11108
N82-11870
AF PROJ. 7670 ..... N82-11637
AF PROJ. 7930 ..... N82-11229
AF PROJ. 9983 ..... N82-11807
AF PROJ. 9993 ..... N82-11704
N82-11708
N82-11709
AF-AFOSR-0105-80 ..... N82-11366
AF-AFOSR-3226-77 ..... N82-11216
ARPA ORDER 2397 ..... N82-11975
ARPA ORDER 3515 ..... N82-11345
ARPA ORDER 3597 ..... N82-11802
ARPA ORDER 3673 ..... N82-11348
ARPA ORDER 3751 ..... N82-11214
DA PROJ. 1E4-63707-D-246 ..... N82-11911
DA PROJ. 1F4-64204-D-275 ..... N82-11455
DA PROJ. 1L1-61101-A9-1A N82-11931
DA PROJ. 1L1-61102-AH-43 ..... N82-11226
N82-11831
DA PROJ. 1L1-61102-AH-60 ..... N82-11188
DA PROJ. 1L1-62105-AH-84 ..... N82-11213
DA PROJ. 1L1-62705-AH-94 ..... N82-11962
DA PROJ. 1L2-62202-AH-85 ..... N82-11064
N82-11065
DA PROJ. 3E1-62720-A-835 ..... N82-11484
N82-11485
DA PROJ. 4A1-61101-A9-1D N82-11315
DA PROJ. 4A7-62719-AT-40 ..... N82-11498
N82-11499
N82-11500
N82-11910
DA PROJ. 4A7-62730-AT-42 ..... N82-11910
DAAB07-77-C-0526 ..... N82-11365
DAAG29-77-G-0061 ..... N82-11829
DAAG29-79-C-0109 ..... N82-11342
DAAG29-79-C-0166 ..... N82-11483
DAAG29-79-C-0204 ..... N82-11211
DAAG29-80-C-0041 ..... N82-11482
DAAG29-80-C-0098 ..... N82-11497
DAAK80-79-C-0270 ..... N82-11064
N82-11065
DAAK80-79-C-0508 ..... N82-11911
DAHC-78-C-0012 ..... N82-11517
DAJA37-80-C-0067 ..... N82-11960
DAMD17-78-C-8073 ..... N82-11484
N82-11485
DE-AC01-76CS-20300 ..... N82-11246
DE-AC01-76ET-10805 ..... N82-11947
DE-AC01-78CE-24390 ..... N82-11590
DE-AC01-78CS-20057 ..... N82-11318
N82-11319
N82-11323
DE-AC01-78ET-11056 ..... N82-11158
DE-AC01-78ET-29335 ..... N82-11381
DE-AC01-79CS-30027 ..... N82-11561
DE-AC01-79ET-14696 ..... N82-11243
DE-AC01-79ET-14700 ..... N82-11259
DE-AC01-79RA-2036 ..... N82-11519
DE-AC01-79RA-20029 ..... N82-11523
DE-AC01-80ER-30010 ..... N82-11249
DE-AC01-80ET-32075 ..... N82-11562
DE-AC02-76CH-00016 ..... N82-11155
N82-11160
N82-11196
N82-11257
N82-11368
N82-11371
N82-11412
N82-11413
N82-11414
N82-11575
N82-11582
N82-11583
N82-11584
N82-11589
N82-11773
N82-11775
N82-11853
N82-11874
N82-11875
N82-11897
N82-11903
DE-AC02-76ER-01198 ..... N82-11198
N82-11918
DE-AC02-76ER-03066 ..... N82-11882
DE-AC02-76ET-20279 ..... N82-11603
DE-AC02-76ET-28359 ..... N82-11404
DE-AC02-76ET-51013 ..... N82-11935
DE-AC02-77CH-0017 ..... N82-11407
DE-AC02-77CH-00178 ..... N82-11045
N82-11325
N82-11553
N82-11557
N82-11558
N82-11559
N82-11563
N82-11572
N82-11597
N82-11605
N82-11606
N82-11608
N82-11609
N82-11610
N82-11611
N82-11612
DE-AC02-77ET-28013 ..... N82-11620
N82-11621
DE-AC02-78CS-34703 ..... N82-11501
DE-AC02-78EG-51013 ..... N82-11906
DE-AC02-78FT-51013 ..... N82-11933
DE-AC02-79CS-30027 ..... N82-11560
DE-AC02-79CS-30139 ..... N82-11425
DE-AC02-80ER-10554 ..... N82-11114
DE-AC02-80ET-15601 ..... N82-11934
DE-AC03-76ET-12056 ..... N82-11153
DE-AC03-76SF-00515 ..... N82-11842
N82-11972
DE-AC03-79ET-11343 ..... N82-11571
DE-AC03-79ET-53057 ..... N82-11955
N82-11956
DE-AC04-76DP-00053 ..... N82-11218
DE-AC04-76DP-00613 ..... N82-11137
N82-11475
DE-AC04-76DP-00789 ..... N82-11044
N82-11115
N82-11200
N82-11201
N82-11221
N82-11241
N82-11266
N82-11355
N82-11370
N82-11377
N82-11379
N82-11440
N82-11483
N82-11506
N82-11556
N82-11564
N82-11565
N82-11566
N82-11567
N82-11568
N82-11569
N82-11570
N82-11576
N82-11617
N82-11649
N82-11713
N82-11714
N82-11797
N82-11854
N82-11887
N82-11893
N82-11908
N82-11951
N82-11952
N82-11953
N82-11974
DE-AC04-76DP-03533 ..... N82-11159
DE-AC04-76EV-01013 ..... N82-11651
DE-AC05-76ET-10104 ..... N82-11268
DE-AC05-76ET-53036 ..... N82-11932
DE-AC06-76RL-01830 ..... N82-11149
N82-11193
N82-11258
N82-11320
N82-11411
DE-AC07-76ID-01570 ..... N82-11265
N82-11521
N82-11876
N82-11883
N82-11941

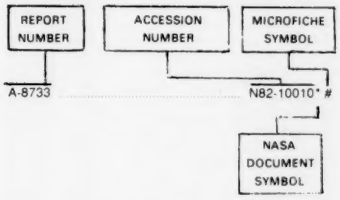
DE-AC08-78DP-40030 ..... N82-11942, N82-11936, N82-11943
DE-AC08-79DP-40083 ..... N82-11937
DE-AC08-79DP-40113 ..... N82-11458
DE-AC08-79ET-26306 ..... N82-11997
DE-AC08-80NV-10133 ..... N82-11522
DE-AC09-76SR-00001 ..... N82-11197
DE-AC09-77ET-12866 ..... N82-11616
DE-AC14-76FF-02170 ..... N82-11191, N82-11896
DE-AC18-80FC-10193 ..... N82-11642
DE-AC22-70ET-14700 ..... N82-11260
DE-AC22-78ET-11343 ..... N82-11571
DE-AC22-80PC-30021 ..... N82-11168
DE-AC22-80PC-30041 ..... N82-11166, N82-11167
DE-AC22-80PC-30080 ..... N82-11165
DE-AC22-80PC-30141 ..... N82-11239
DE-AC22-80PC-30295 ..... N82-11641
DE-AC22-80PC-30304 ..... N82-11164
DE-AC22-80PC-30307 ..... N82-11242
DE-AC22-80PC30290 ..... N82-11250
DE-AC22-81PC-40265 ..... N82-11148
DE-AI01-76ET-12548 ..... N82-11516
DE-AI01-76ET-20356 ..... N82-11435, N82-11548
DE-AI01-77CS-51040 ..... N82-11466
DE-AI01-77ET-12547 ..... N82-11145
DE-AI01-79CS-50080 ..... N82-11994
DE-AI01-81ET-20307 ..... N82-11209
DE-AI21-77ET-13032 ..... N82-11146
DE-AM02-76CH-03073 ..... N82-11462
DE-AS01-76ET-10517 ..... N82-11236
DE-AS02-76ER-02119 ..... N82-11375
DE-AS02-76ET-28320 ..... N82-11585
DE-AS02-76EV-03335 ..... N82-11776
DE-AS02-76EV-12195 ..... N82-11731
DE-AS02-77ER-04445 ..... N82-11199
DE-AS02-77EV-04498 ..... N82-11648
DE-AS02-78ER-05002 ..... N82-11973
DE-AS02-78ET-51002 ..... N82-11905
DE-AS02-78ET-52048 ..... N82-11954
DE-AS04-79CS-30174 ..... N82-11618
DE-AS09-76ER-00884 ..... N82-11895
DE-AT03-76ET-35300 ..... N82-11904
DE-AT03-76ET-51011 ..... N82-11813
DE-AT04-81AL-16228 ..... N82-11549
DE-A101-79ET-27025 ..... N82-11535
DE-FC02-80CS-30584 ..... N82-11324
DE-FG01-79RA-20219 ..... N82-11237
DE-FG01-79RA-20223 ..... N82-11240
DE-FG01-80RA-50135 ..... N82-11238
DE-FG01-80RA-50146 ..... N82-11233
DE-FG02-79CS-30292 ..... N82-11614
DE-FG02-80R5-10226 ..... N82-11380
DE-FG02-81AF-92005 ..... N82-11235
DE-FG02-81AF-92016 ..... N82-11234
DE-FG05-77CS-20347 ..... N82-11554
DE-14-34-0001-9131 ..... N82-11668
DEN3-176 ..... N82-11545
DEN3-227 ..... N82-11466
DI-BM-GO-155191 ..... N82-11222
DI-BM-H0-292025 ..... N82-11538
DI-BM-JO-88144 ..... N82-11652
DI-BM-JO-188144 ..... N82-11655
DI-BM-J0199118 ..... N82-11782, N82-11783
DI-8-07-83-V0016 ..... N82-11737, N82-11738
DI-14-31-0001-4051 ..... N82-11443
DI-14-31-0001-5051 ..... N82-11443
DNA001-79-C-0153 ..... N82-11710
DNA001-80-C-0069 ..... N82-11437
DNA001-80-C-0177 ..... N82-11354
DOE-EX-76-A-36-1008 ..... N82-11535
DYNATECH PROJ. MGC-2 ..... N82-11243
D1-BM-J0-188144 ..... N82-11653
EF-76-01-2308-10 ..... N82-11236
EG-77-C-01-3042 ..... N82-11563
EG-77-C-01-4042 ..... N82-11045, N82-11325, N82-11407, N82-11559, N82-11572, N82-11606, N82-11608, N82-11611, N82-11612
EG-77-CH-01-4042 ..... N82-11609
EG-77-G-05-5565 ..... N82-11554
EM-78-C-02-4703 ..... N82-11501
EPA-R-803988 ..... N82-11663
EPA-R-804585 ..... N82-11779
EPA-R-804979 ..... N82-11273
EPA-R-805184 ..... N82-11778
EPA-R-806146 ..... N82-11660
EPA-68-01-4140 ..... N82-11658
EPA-68-01-6310 ..... N82-11679
EPA-68-02-0205 ..... N82-11178
EPA-68-02-1415 ..... N82-11654
EPA-68-02-2474 ..... N82-11171
EPA-68-02-2547 ..... N82-11678
EPA-68-02-3170 ..... N82-11656
EPA-68-02-3171-28 ..... N82-11176
EPA-68-02-3173 ..... N82-11662, N82-11985
EPA-68-02-3510 ..... N82-11672
EPRI PROJ. 422-3 ..... N82-11193
EPRI PROJ. 625-2 ..... N82-11217
EPRI PROJ. 734-1 ..... N82-11507
EPRI PROJ. 1049-1 ..... N82-11382, N82-11383
EPRI PROJ. 1061 ..... N82-11643
EPRI PROJ. 1081-1 ..... N82-11620, N82-11621
EPRI PROJ. 1237-1 ..... N82-11502
EPRI PROJ. 1278-1 ..... N82-11369
ET-78-C-01-2867 ..... N82-11381
ET-78-C-01-3084 ..... N82-11158
ET-78-C-03-2039 ..... N82-11571
EW-78-X-03-0509 ..... N82-11172
EX-76-A-29-1012 ..... N82-11435, N82-11548
EX-76-C-01-0496 ..... N82-11268
EY-76-S-02-3335 ..... N82-11776
F04701-80-C-0081 ..... N82-11112, N82-11134
F08635-77-C-0034 ..... N82-11086
F19628-77-C-0152 ..... N82-11711
F19628-77-C-0203 ..... N82-11639
F19628-78-C-001 ..... N82-11635
F19628-78-C-0017 ..... N82-11705
F19628-78-C-0025 ..... N82-11343
F19628-78-C-0050 ..... N82-11700
F19628-78-C-0060 ..... N82-11135
F19628-78-C-0090 ..... N82-11347
F19628-78-C-0122 ..... N82-11363
F19628-78-C-0200 ..... N82-11637
F19628-78-C-0205 ..... N82-11367
F19628-78-C-0217 ..... N82-11706
F19628-78-C-0218 ..... N82-11438
F19628-79-C-0016 ..... N82-11965
F19628-79-C-0031 ..... N82-11870
F19628-79-C-0046 ..... N82-11699
F19628-79-C-0066 ..... N82-11707
F19628-79-C-0163 ..... N82-11709
F19628-80-C-0002 ..... N82-11348
F19628-80-C-0124 ..... N82-11708
F19628-80-C-0165 ..... N82-11345
F29601-76-C-0051 ..... N82-11313
F29601-79-C-0003 ..... N82-11457
F30602-78-C-0326 ..... N82-11963
F30602-79-C-0197 ..... N82-11104
F30602-80-C-0115 ..... N82-11804
F33615-76-C-1243 ..... N82-11062
F33615-77-C-2034 ..... N82-11072
F33615-78-C-1551 ..... N82-11802
F33615-78-C-3607 ..... N82-11048
F33615-78-C-5184 ..... N82-11496
F33615-79-C-0009 ..... N82-11789
GA PROJ. 6400 ..... N82-11904
GEN. ATOMIC PROJ. 3344 ..... N82-11813
GRI-5011-321-0101 ..... N82-11271
GRI-5014-341-0114 ..... N82-11478
GRI-5080-352-0322 ..... N82-11202
GR1-5080-351-0316 ..... N82-11274, N82-11657
HS-3650 ..... N82-11987
JPL PROJ. 5030-470 ..... N82-11148
LEAA-79-NI-R-004 ..... N82-11986
LM-03370 ..... N82-11987
NAGW-100 ..... N82-12004
NAG1-67 ..... N82-11723
NAG1-68 ..... N82-11121
NAG1-171 ..... N82-11099
NAG3-71 ..... N82-11052
NAG3-175 ..... N82-11959
NAG5-75 ..... N82-12010
NAG5-150 ..... N82-11696
NASA ORDER L-72497-A N82-11833, N82-11834
NASW-3198 ..... N82-11097, N82-11223, N82-11759, N82-12016
NASW-3199 ..... N82-11096, N82-11119, N82-11120, N82-11180, N82-11225, N82-11771
NASW-3328 ..... N82-11492
NASW-3389 ..... N82-11691
NASW-3541 ..... N82-11186, N82-11697, N82-11725, N82-11757, N82-11758, N82-11989
NASW-3542 ..... N82-11185, N82-11636, N82-11760
NAS1-14996 ..... N82-11453
NAS1-15593 ..... N82-11070
NAS1-15721 ..... N82-11858
NAS1-15730 ..... N82-11859
NAS1-15848 ..... N82-11116
NAS1-15962 ..... N82-11452
NAS1-16052 ..... N82-11688
NAS1-16380 ..... N82-11515
NAS2-9885 ..... N82-11991, N82-11992
NAS3-20583 ..... N82-11547
NAS3-20630 ..... N82-11467
NAS3-21276 ..... N82-11546
NAS3-21356 ..... N82-11468
NAS3-21952 ..... N82-11110, N82-11111
NAS3-21977 ..... N82-11224
NAS3-22045 ..... N82-11230
NAS3-22129 ..... N82-11041
NAS3-22149 ..... N82-11068
NAS3-22274 ..... N82-11390
NAS3-22480 ..... N82-11465
NAS4-2518 ..... N82-11078
NAS5-20064 ..... N82-11105
NAS5-20825 ..... N82-11101
NAS5-20900 ..... N82-11511
NAS5-20995 ..... N82-12019
NAS5-24391 ..... N82-11103
NAS5-25527 ..... N82-11513
NAS5-25781 ..... N82-11512
NAS5-25786 ..... N82-11800
NAS5-25870 ..... N82-11690
NAS5-25993 ..... N82-11338
NAS5-26430 ..... N82-11801
NAS7-100 ..... N82-11095, N82-11146, N82-11209, N82-11279, N82-11341, N82-11435, N82-11436, N82-11469, N82-11514, N82-11516, N82-11548, N82-11549, N82-11550, N82-11785, N82-11861, N82-11994, N82-12015
NAS8-30890 ..... N82-11181
NAS8-32643 ..... N82-11544
NAS8-32920 ..... N82-11094
NAS8-32994 ..... N82-11958
NAS8-33100 ..... N82-11862
NAS8-33388 ..... N82-11207
NAS8-33816 ..... N82-11040
NAS8-33847 ..... N82-11889
NAS8-33980 ..... N82-11490
NA79AA-D-00054 ..... N82-11754
NA79AA-D-00085 ..... N82-11536
NBS-78-3603 ..... N82-11664, N82-11665, N82-11666
NCC2-15 ..... N82-11393, N82-11394

N82-11395
N82-11396
NGL-39-009-007 ..... N82-11031
NGR-2-15 ..... N82-11395
NGR-05-003-553 ..... N82-12020
NOAA-04-4-022-26 ..... N82-11741
NR PROJ. 049-383 ..... N82-11349
N82-11791
N82-11844
NR PROJ. 049-466 ..... N82-11803
NR PROJ. 056-749 ..... N82-11964
NR PROJ. 196-190 ..... N82-11806
NR PROJ. 197-071 ..... N82-11843
NR PROJ. 372-909 ..... N82-11961
NR PROJ. 277236 ..... N82-11839
NSF ATM-77-23757 ..... N82-11732
N82-11736
N82-11739
N82-12017
N82-12018
NSF CHE-77-21305 ..... N82-11811
NSF CME-79-18053 ..... N82-11327
NSF ECS 79-25340 ..... N82-11130
N82-11131
N82-11132
NSF ECS-79-20834 ..... N82-11844
NSF ECS-79-25340 ..... N82-11125
N82-11126
N82-11127
N82-11128
N82-11129
N82-11133
NSF ENG-76-19677 ..... N82-11266
NSF ENG-78-17619 ..... N82-11394
N82-11395
NSF ENV-76-00715 ..... N82-11326
NSF ENV-77-01599 ..... N82-11752
NSF ISP-77-19055 ..... N82-11978
NSF MCS-77-03273 ..... N82-11802
NSF OCE-78-26229 ..... N82-11751
NSF PFR-78-23085 ..... N82-11328
NSG-1320 ..... N82-11493
NSG-1377 ..... N82-11039
NSG-1414 ..... N82-11100
NSG-2142 ..... N82-11071
NSG-2182 ..... N82-11208
NSG-5295 ..... N82-11724
NSG-5335 ..... N82-11510
NSG-7159 ..... N82-11695
NSG-7360 ..... N82-11698
NSG-7610 ..... N82-11694
N00014-18-K-0314 ..... N82-11843
N00014-69-C-0391 ..... N82-11086
N00014-75-C-0496 ..... N82-11361
N00014-75-C-0573 ..... N82-11790
N00014-75-C-1183 ..... N82-11349
N82-11791
N82-11844
N00014-75-C-01444 ..... N82-11078
N00014-76-C-0354 ..... N82-11827
N00014-76-C-1097 ..... N82-11966
N00014-78-C-0634 ..... N82-11494
N00014-79-C-0224 ..... N82-11481
N82-11495
N82-11851
N00014-79-C-0241 ..... N82-11471
N00014-79-C-0321 ..... N82-11482
N00014-79-C-0404 ..... N82-11863
N00014-79-C-0583 ..... N82-11187
N00014-79-C-0595 ..... N82-11806
N00014-79-C-0801 ..... N82-11828
N82-11835
N82-11836
N82-11837
N00014-79-C-0832 ..... N82-11839
N00014-80-C-0296 ..... N82-11803
N00014-80-C-0299 ..... N82-11350
N62-11351
N82-11352
N00014-80-C-0351 ..... N82-11751
N00014-80-C-0424 ..... N82-11403
N00014-80-C-0472 ..... N82-11964
N00014-80-C-0498 ..... N82-11961
N00014-80-C-0838 ..... N82-11912
N00014-81-WR-10034 ..... N82-11805
N00019-80-C-0319 ..... N82-11215
N00024-79-C-6043 ..... N82-11402
N00173-79-C-0129 ..... N82-11364
N00173-80-C-0563 ..... N82-11913
N60921-81-C-0084 ..... N82-11552
N61339-74-C-0039 ..... N82-11455
N62269-78-C-0069 ..... N82-11063
N62269-79-C-0295 ..... N82-11055
PHS-R01-HL-24177 ..... N82-11775
RESEARCH PROJ. 71-08-1 ..... N82-11330
RR00785 ..... N82-11987
RR0000110 ..... N82-11805
N82-11809
RR0140241 ..... N82-11838
SRI PROJ. 1350-100 ..... N82-11803
TF5351019 ..... N82-11794
W-31-109-ENG-38 ..... N82-11152
N82-11169
N82-11190
N82-11244
N82-11245
N82-11317
N82-11518
N82-11573
N82-11578
N82-11579
N82-11580
N82-11644
N82-11881
N82-11890
N82-11901
N82-11902
N82-11970
W-7405-ENG-26 ..... N82-11150
N82-11151
N82-11154
N82-11157
N82-11163
N82-11321
N82-11322
N82-11405
N82-11409
N82-11410
N82-11415
N82-11416
N82-11417
N82-11418
N82-11419
N82-11420
N82-11421
N82-11422
N82-11423
N82-11424
N82-11429
N82-11441
N82-11442
N82-11476
N82-11478
N82-11555
N82-11574
N82-11586
N82-11587
N82-11619
N82-11643
N82-11774
N82-11777
N82-11841
N82-11845
N82-11886
N82-11892
N82-11907
N82-11948
N82-11950
W-7405-ENG-36 ..... N82-11046
N82-11066
N82-11162
N82-11262
N82-11373
N82-11408
N82-11426
N82-11427
N82-11428
N82-11439
N82-11459
N82-11473
N82-11503
N82-11591
N82-11598
N82-11599
N82-11600
N82-11601
N82-11602
N82-11715
N82-11796
N82-11814
N82-11884
N82-11885
N82-11891
N82-11919
N82-11944
N82-11945
N82-11946
N82-11971
N82-11988
N82-12005
N82-12006
W-7405-ENG-48 ..... N82-11161
N82-11192
N82-11194
N82-11195
N82-11219
N82-11220
N82-11247
N82-11248
N82-11256
N82-11263
N82-11267
N82-11374
N82-11378
N82-11460
N82-11474
N82-11504
N82-11505
N82-11592
N82-11593
N82-11595
N82-11596
N82-11645
N82-11646
N82-11647
N82-11712
N82-11795
N82-11810
N82-11811
N82-11812
N82-11818
N82-11852
N82-11872
N82-11873
N82-11877
N82-11878
N82-11879
N82-11880
N82-11898
N82-11899
N82-11915
N82-11916
N82-11938
N82-11939
N82-11940
N82-11967
N82-11968
N82-11969
N82-11995
N82-12020
W-7405-ENG-82 ..... N82-11372
N82-11581
N82-11650
WF62582000 ..... N82-11788
XF12151104 ..... N82-11346
ZF43451001 ..... N82-11231
ZF59551002 ..... N82-11730
156-01-05-31 ..... N82-12015
156-04-34-01 ..... N82-11340
199-50-18-03 ..... N82-11281
199-50-94-01 ..... N82-11095
310-20-65-04 ..... N82-11301
310-20-65-14 ..... N82-11292
310-20-66-50 ..... N82-11293
310-20-67-13 ..... N82-11289
310-20-67-25 ..... N82-11286
310-20-67-57 ..... N82-11290
N82-11291
310-20-67-59 ..... N82-11288
310-20-67-62 ..... N82-11287
310-30-68-50 ..... N82-11294
310-30-70-55 ..... N82-11295
310-40-73-00 ..... N82-11296
311-03-11-10 ..... N82-11308
311-03-11-12 ..... N82-11306
311-03-11-16 ..... N82-11307
311-03-12-10 ..... N82-11304
311-03-14-11 ..... N82-11305
311-03-21-00 ..... N82-11280
N82-11309

311-03-22-10 ..... N82-11285
311-03-31-10 ..... N82-11283
311-03-31-10-83 ..... N82-11279
311-03-31-30 ..... N82-11284
311-03-41-08 ..... N82-11310
311-03-41-82 ..... N82-11297
N82-11298
N82-11299
311-03-41-93 ..... N82-11302
311-06-40-00 ..... N82-11282
312-03-57-80 ..... N82-11303
312-22-20-12 ..... N82-11300
500-42-62 ..... N82-11043
505-31-21 ..... N82-11398
505-31-33-05 ..... N82-11033
505-31-41 ..... N82-11054
505-31-63-03 ..... N82-11090
505-32-03-01 ..... N82-11860
505-32-52 ..... N82-11031
N82-11041
505-32-93-01 ..... N82-11032
505-33-12 ..... N82-11182
505-33-33-05 ..... N82-11488
505-34-11 ..... N82-11018
505-34-13-02 ..... N82-11339
505-34-33-02 ..... N82-11051
505-43-13-01 ..... N82-11013
506-53-12 ..... N82-11183
506-53-53-03 ..... N82-11489
506-53-65-01 ..... N82-11098
506-55-42 ..... N82-11546
N82-11551
506-55-72 ..... N82-11106
N82-11107
506-89-01-01 ..... N82-11434
510-54-13-01 ..... N82-11816
530-01-13-02 ..... N82-11050
534-01-13-14 ..... N82-11391
776-42-61 ..... N82-11516
776-52-61 ..... N82-11548
776-81-61 ..... N82-11550
776-81-62 ..... N82-11549
778-34-35 ..... N82-11994
778-35-03 ..... N82-11466
778-42-02 ..... N82-11145
778-43-02 ..... N82-11146
778-83-01 ..... N82-11397

REPORT/ACCESSION NUMBER INDEX

Typical Report/Accession Number Index Listing



Listings in this index are arranged alpha-numerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-8604 ..... N82-11398* #
A-8741 ..... N82-11054* #
A-8746 ..... N82-11018* #

ACS-12177 ..... N82-11064 #
ACS-12385 ..... N82-11065 #

ACUREX-TR-81-01/SR ..... N82-11642 #

AD-A102853 ..... N82-11216 #
AD-A103048 ..... N82-11187 #
AD-A104239 ..... N82-11455 #
AD-A104241 ..... N82-11912 #
AD-A104242 ..... N82-11342 #
AD-A104243 ..... N82-11064 #
AD-A104244 ..... N82-11065 #
AD-A104245 ..... N82-11839 #
AD-A104246 ..... N82-11497 #
AD-A104249 ..... N82-11804 #
AD-A104260 ..... N82-11483 #
AD-A104263 ..... N82-11072 #
AD-A104272 ..... N82-11637 #
AD-A104293 ..... N82-11829 #
AD-A104296 ..... N82-11345 #
AD-A104306 ..... N82-11346 #
AD-A104312 ..... N82-11104 #
AD-A104313 ..... N82-11188 #
AD-A104314 ..... N82-11364 #
AD-A104317 ..... N82-11638 #
AD-A104319 ..... N82-11705 #
AD-A104320 ..... N82-11827 #
AD-A104323 ..... N82-11314 #
AD-A104325 ..... N82-11437 #
AD-A104326 ..... N82-11552 #
AD-A104336 ..... N82-11315 #
AD-A104337 ..... N82-11062 #
AD-A104338 ..... N82-11639 #
AD-A104340 ..... N82-11709 #
AD-A104343 ..... N82-11706 #
AD-A104344 ..... N82-11454 #
AD-A104345 ..... N82-11805 #
AD-A104362 ..... N82-11700 #
AD-A104363 ..... N82-11961 #
AD-A104364 ..... N82-11063 #
AD-A104372 ..... N82-11843 #
AD-A104373 ..... N82-11348 #
AD-A104374 ..... N82-11702 #
AD-A104375 ..... N82-11689 #
AD-A104376 ..... N82-11400 #
AD-A104377 ..... N82-11726 #
AD-A104378 ..... N82-11708 #
AD-A104382 ..... N82-11226 #
AD-A104383 ..... N82-11227 #
AD-A104384 ..... N82-11703 #
AD-A104388 ..... N82-11517 #
AD-A104392 ..... N82-11707 #
AD-A104393 ..... N82-11365 #
AD-A104403 ..... N82-11366 #
AD-A104405 ..... N82-11495 #
AD-A104406 ..... N82-11851 #
AD-A104407 ..... N82-11481 #
AD-A104409 ..... N82-11863 #
AD-A104412 ..... N82-11472 #
AD-A104414 ..... N82-11228 #
AD-A104417 ..... N82-11349 #
AD-A104418 ..... N82-11791 #
AD-A104419 ..... N82-11844 #
AD-A104424 ..... N82-11456 #
AD-A104436 ..... N82-11482 #
AD-A104438 ..... N82-11363 #
AD-A104439 ..... N82-11965 #
AD-A104440 ..... N82-11963 #
AD-A104445 ..... N82-11790 #
AD-A104449 ..... N82-11960 #
AD-A104468 ..... N82-11803 #
AD-A104469 ..... N82-11910 #
AD-A104473 ..... N82-11471 #
AD-A104474 ..... N82-11837 #
AD-A104475 ..... N82-11828 #
AD-A104476 ..... N82-11836 #
AD-A104480 ..... N82-11835 #
AD-A104482 ..... N82-11966 #
AD-A104491 ..... N82-11911 #
AD-A104492 ..... N82-11347 #
AD-A104493 ..... N82-11343 #
AD-A104494 ..... N82-11135 #
AD-A104495 ..... N82-11112 #
AD-A104496 ..... N82-11212 #
AD-A104506 ..... N82-11789 #
AD-A104507 ..... N82-11870 #
AD-A104508 ..... N82-11344 #
AD-A104509 ..... N82-11699 #
AD-A104510 ..... N82-11362 #
AD-A104512 ..... N82-11438 #
AD-A104513 ..... N82-11704 #
AD-A104514 ..... N82-11055 #
AD-A104517 ..... N82-11871 #
AD-A104518 ..... N82-11701 #
AD-A104519 ..... N82-11108 #
AD-A104522 ..... N82-11964 #
AD-A104524 ..... N82-11787 #
AD-A104525 ..... N82-11838 #
AD-A104530 ..... N82-11350 #
AD-A104531 ..... N82-11351 #
AD-A104532 ..... N82-11352 #
AD-A104534 ..... N82-11361 #
AD-A104539 ..... N82-11751 #
AD-A104541 ..... N82-11806 #
AD-A104542 ..... N82-11048 #
AD-A104543 ..... N82-11788 #
AD-A104544 ..... N82-11931 #
AD-A104545 ..... N82-11498 #
AD-A104546 ..... N82-11499 #
AD-A104547 ..... N82-11500 #
AD-A104552 ..... N82-11484 #
AD-A104553 ..... N82-11485 #
AD-A104554 ..... N82-11710 #
AD-A104555 ..... N82-11772 #
AD-A104556 ..... N82-11215 #
AD-A104557 ..... N82-11354 #
AD-A104561 ..... N82-11214 #
AD-A104562 ..... N82-11402 #
AD-A104563 ..... N82-11047 #
AD-A104566 ..... N82-11403 #
AD-A104574 ..... N82-11990 #
AD-A104575 ..... N82-11457 #
AD-A104578 ..... N82-11914 #
AD-A104579 ..... N82-11794 #
AD-A104580 ..... N82-11231 #
AD-A104584 ..... N82-11913 #
AD-A104586 ..... N82-11808 #
AD-A104587 ..... N82-11792 #
AD-A104588 ..... N82-11353 #
AD-A104589 ..... N82-11189 #
AD-A104590 ..... N82-11727 #
AD-A104591 ..... N82-11728 #
AD-A104595 ..... N82-11729 #
AD-A104597 ..... N82-11069 #
AD-A104603 ..... N82-11232 #
AD-A104604 ..... N82-11401 #
AD-A104622 ..... N82-11136 #
AD-A104624 ..... N82-11793 #
AD-A104625 ..... N82-11830 #
AD-A104627 ..... N82-11091 #
AD-A104631 ..... N82-11831 #
AD-A104633 ..... N82-11730 #
AD-A104635 ..... N82-11840 #
AD-A104636 ..... N82-11977 #
AD-A104650 ..... N82-11809 #
AD-A104657 ..... N82-11367 #
AD-A104658 ..... N82-11213 #
AD-A104660 ..... N82-11313 #
AD-A104672 ..... N82-11496 #
AD-A104673 ..... N82-11230* #
AD-A104674 ..... N82-11802 #
AD-A104675 ..... N82-11229 #
AD-A104676 ..... N82-11807 #
AD-A104679 ..... N82-11786 #
AD-A104680 ..... N82-11134 #
AD-A104684 ..... N82-11781 #
AD-A104685 ..... N82-11962 #
AD-A104686 ..... N82-11930 #
AD-A104687 ..... N82-11494 #
AD-A105072 ..... N82-11711 #
AD-A105184 ..... N82-11014 #
AD-A105604 ..... N82-11023* #
AD-A105635 ..... N82-12021 #
AD-A105636 ..... N82-11019 #

AD-E400687 ..... N82-11227 #
AD-E430677 ..... N82-11226 #

ADL-C-82426-PT-1 ..... N82-11484 #
ADL-C-82426-PT-2 ..... N82-11485 #

AEDC-TR-81-18 ..... N82-11930 #

AFGL-ERP-731 ..... N82-11702 #
AFGL-ERP-732 ..... N82-11689 #
AFGL-ERP-735 ..... N82-11726 #
AFGL-ERP-737 ..... N82-11703 #
AFGL-ERP-741 ..... N82-11108 #
AFGL-ERP-744 ..... N82-11701 #

AFGL-SR-227 ..... N82-11704 #

AFGL-TR-80-0192 ..... N82-11637 #
AFGL-TR-80-0365 ..... N82-11704 #
AFGL-TR-80-0371 ..... N82-11708 #
AFGL-TR-81-0025 ..... N82-11706 #
AFGL-TR-81-0030 ..... N82-11711 #
AFGL-TR-81-0056 ..... N82-11638 #
AFGL-TR-81-0057 ..... N82-11709 #
AFGL-TR-81-0070 ..... N82-11702 #
AFGL-TR-81-0071 ..... N82-11689 #
AFGL-TR-81-0089 ..... N82-11726 #
AFGL-TR-81-0105 ..... N82-11707 #
AFGL-TR-81-0111 ..... N82-11703 #
AFGL-TR-81-0131 ..... N82-11701 #
AFGL-TR-81-0134 ..... N82-11639 #
AFGL-TR-81-0142 ..... N82-11108 #
AFGL-TR-81-0143 ..... N82-11700 #
AFGL-TR-81-0167 ..... N82-11870 #
AFGL-TR-81-0202 ..... N82-11438 #
AFGL-TR-81-0222 ..... N82-11699 #
AFGL-TR-81-0223 ..... N82-11705 #

AFHRL-TP-81-28 ..... N82-11807 #

AFHRL-TR-80-64 ..... N82-11789 #

AFIT-CI-81-3T ..... N82-11786 #

AFOSR-81-0629TR ..... N82-11216 #

AFRPL-TR-81-59 ..... N82-11112 #

AFWAL-TR-80-2029 ..... N82-11454 #
AFWAL-TR-81-1042 ..... N82-11062 #
AFWAL-TR-81-2012 ..... N82-11072 #
AFWAL-TR-81-2063 ..... N82-11228 #
AFWAL-TR-81-3012 ..... N82-11048 #
AFWAL-TR-81-4016 ..... N82-11496 #

AFWL-TR-80-104 ..... N82-11457 #

AG-1446 ..... N82-11354 #

AGARD-AG-251 ..... N82-11073 #

AGARD-AR-166 ..... N82-11056 #

AIAA-81-2627 ..... N82-11042* #

AK-06250 ..... N82-11532 #

AMA-81-25 ..... N82-11070* #

AMMRC-TR-81-34 ..... N82-11213 #

ANL-80-121 ..... N82-11890 #
ANL-81-14 ..... N82-11578 #
ANL-81-30 ..... N82-11169 #

ANL/CNSV-TM-68 ..... N82-11317 #
ANL/CNSV-TM-77 ..... N82-11579 #
ANL/CNSV-TM-80 ..... N82-11152 #

ANL/CNSV-22 ..... N82-11244 #

ANL/EES-TM-142 ..... N82-11644 #
ANL/EES-TM-144 ..... N82-11573 #
ANL/EES-TM-149 ..... N82-11245 #

ANL/ES-116 ..... N82-11518 #

ANL/OTEC-BCM-018-PT-2 ..... N82-11190 #

ARBRL-MR-03126 ..... N82-11831 #

ARBRL-TR-02345 ..... N82-11226 #

ARCE-R80-1 ..... N82-11328 #

ARL/PSU-TM-81-176 ..... N82-11402 #

ARLCB-TR-81035 ..... N82-11188 #

ARLCD-TR-81026 ..... N82-11227 #

ARO-14092.20-M ..... N82-11829 #
ARO-16297.1-EL ..... N82-11342 #
ARO-16668.4-M ..... N82-11483 #
ARO-17082.1-MS ..... N82-11497 #

ASD-TR-81-5016 ..... N82-11781 #

ATR-1 ..... N82-11478 #
ATR-1 ..... N82-11960 #

BATT-G7308-F ..... N82-11471 #

BBC-RD-1981/5 ..... N82-11334
BBC-RD-1981/6 ..... N82-11855

BBN-4766 ..... N82-11345 #

BDX-613-2644 ..... N82-11475 #
BDX-613-2645 ..... N82-11137 #

BLR/D-5607 ..... N82-11984 #

BM-IC-8842 ..... N82-11628 #

BM-OFR-66-81 ..... N82-11222 #
BM-OFR-79-81 ..... N82-11538 #
BM-OFR-86(1)-81-VOL-1 ..... N82-11782 #
BM-OFR-86(2)-81-VOL-2 ..... N82-11783 #
BM-OFR-94(2)-81 ..... N82-11655 #
BM-OFR-94(3)-81 ..... N82-11652 #
BM-OFR-94(4)-81 ..... N82-11653 #

BM-RI-8526 ..... N82-11174 #
BM-RI-8545 ..... N82-11333 #

BNL-28832 ..... N82-11874 #
BNL-28979 ..... N82-11160 #
BNL-29281 ..... N82-11257 #
BNL-29291 ..... N82-11371 #
BNL-29512 ..... N82-11903 #
BNL-29592 ..... N82-11414 #
BNL-29612 ..... N82-11897 #
BNL-29625 ..... N82-11412 #
BNL-29668 ..... N82-11575 #
BNL-29672 ..... N82-11196 #
BNL-29675 ..... N82-11875 #
BNL-29677 ..... N82-11413 #
BNL-29678 ..... N82-11583 #
BNL-29680 ..... N82-11584 #
BNL-29719 ..... N82-11853 #
BNL-29720 ..... N82-11589 #
BNL-29737 ..... N82-11775 #
BNL-29788 ..... N82-11582 #
BNL-29958 ..... N82-11773 #
BNL-51369 ..... N82-11155 #
BNL-51370 ..... N82-11368 #

BR-77840 ..... N82-11030 #

BR77975 ..... N82-11389
BR77976 ..... N82-11205 #
BR77988 ..... N82-11487
BR78139 ..... N82-11029
BR78650 ..... N82-11089
BR79520 ..... N82-11766
BR79865 ..... N82-11335
BR79866 ..... N82-11179
BR80139 ..... N82-11767
BR80140 ..... N82-11486

C-OF-A-MEMO-8109 ..... N82-11037 #
C-OF-A-MEMO-8110 ..... N82-11038 #
C-OF-A-MEMO-8112 ..... N82-11036 #

CAR-81-1 ..... N82-11490* #

CCVSR750 ..... N82-11799 #

CCVS74-VSR800 ..... N82-11798 #

CED-81-30-VOL-1 ..... N82-11675 #
CED-81-30-VOL-2 ..... N82-11676 #
CED-81-39 ..... N82-11761 #
CED-81-100 ..... N82-11049 #

CERC-CETA-81-8 ..... N82-11314 #
CERC-CETA-81-10 ..... N82-11400 #

CFT-RR-81-15 ..... N82-11181* #

CMU-CS-81-113 ..... N82-11802 #

CONF-81-429-34 ..... N82-11944 #
CONF-7405-ENG-36 ..... N82-11461 #
CONF-800612-5 ..... N82-11996 #
CONF-800839-2 ..... N82-11372 #
CONF-800864-3 ..... N82-11970 #
CONF-801016-25 ..... N82-11581 #
CONF-801037-9-REV-1 ..... N82-11873 #
CONF-801119-7 ..... N82-11938 #
CONF-801166-3 ..... N82-11411 #
CONF-801233-10 ..... N82-11588 #
CONF-810340-14 ..... N82-11954 #
CONF-810351-3 ..... N82-11161 #
CONF-810368-3 ..... N82-11882 #
CONF-810372-3 ..... N82-11893 #
CONF-810372-5 ..... N82-11714 #
CONF-810385-1 ..... N82-11853 #
CONF-810385-2 ..... N82-11969 #
CONF-810434-4-REV-1 ..... N82-11442 #
CONF-810434-5-ADD-1 ..... N82-11441 #
CONF-810434-6-REV-2 ..... N82-11409 #
CONF-810468-9 ..... N82-11897 #
CONF-810469-3 ..... N82-11247 #
CONF-810477-2 ..... N82-11589 #
CONF-810491-1 ..... N82-11777 #
CONF-810495-2 ..... N82-11972 #
CONF-810497-1 ..... N82-11262 #
CONF-810521-2 ..... N82-11797 #
CONF-810523-9 ..... N82-11810 #
CONF-810526-16 ..... N82-11622 #
CONF-810526-30 ..... N82-11597 #
CONF-810526-32 ..... N82-11605 #
CONF-810526-36 ..... N82-11610 #
CONF-810526-37 ..... N82-11608 #
CONF-810526-38 ..... N82-11575 #
CONF-810527-6 ..... N82-11903 #
CONF-810539-8 ..... N82-11875 #
CONF-810602-31 ..... N82-11264 #
CONF-810606-57 ..... N82-11896 #
CONF-810606-75 ..... N82-11265 #
CONF-810606-78 ..... N82-11883 #
CONF-810606-80 ..... N82-11942 #
CONF-810606-82 ..... N82-11941 #
CONF-810606-84 ..... N82-11876 #
CONF-810613-7 ..... N82-11160 #
CONF-810613-9 ..... N82-11916 #
CONF-810613-10-REV-1 ..... N82-11460 #
CONF-810620-8 ..... N82-11945 #
CONF-810620-9 ..... N82-11884 #
CONF-810620-12 ..... N82-11953 #
CONF-810622-7 ..... N82-11645 #
CONF-810642-5 ..... N82-11594 #
CONF-810647-7 ..... N82-11936 #
CONF-810647-8 ..... N82-11775 #
CONF-810659-13 ..... N82-11373 #
CONF-810659-15 ..... N82-11591 #
CONF-810659-18 ..... N82-11379 #
CONF-810659-20 ..... N82-11378 #
CONF-810659-24 ..... N82-11887 #
CONF-810659-25 ..... N82-11908 #
CONF-810659-26 ..... N82-11219 #
CONF-810664-2 ..... N82-11046* #
CONF-810668 ..... N82-11157 #
CONF-810672-1 ..... N82-11415 #
CONF-810672-2 ..... N82-11416 #
CONF-810672-3 ..... N82-11417 #
CONF-810672-5 ..... N82-11418 #
CONF-810672-6 ..... N82-11586 #
CONF-810672-7 ..... N82-11419 #
CONF-810672-9 ..... N82-11420 #
CONF-810672-11 ..... N82-11421 #
CONF-810672-13 ..... N82-11422 #
CONF-810672-14 ..... N82-11423 #
CONF-810672-20 ..... N82-11424 #
CONF-810672-22 ..... N82-11414 #
CONF-810673-2 ..... N82-11885 #
CONF-810679-1 ..... N82-11587 #
CONF-810680-2 ..... N82-11948 #
CONF-810682-7 ..... N82-11900 #
CONF-810684-24 ..... N82-11374 #
CONF-810684-25 ..... N82-11200 #
CONF-810684-29 ..... N82-11971 #
CONF-810684-35 ..... N82-11115 #
CONF-810684-36 ..... N82-11854 #
CONF-810684-41 ..... N82-11952 #
CONF-810699-1 ..... N82-11907 #
CONF-810705-6 ..... N82-11159 #
CONF-810720-3 ..... N82-11163 #
CONF-810724-1 ..... N82-11066 #
CONF-810726-1 ..... N82-11974 #
CONF-810732-1 ..... N82-11886 #
CONF-810805-6 ..... N82-11811 #
CONF-810808-2 ..... N82-11257 #
CONF-810808-9 ..... N82-11606 #
CONF-810810-18 ..... N82-11919 #
CONF-810811-1 ..... N82-11195 #
CONF-810812-25 ..... N82-11412 #
CONF-810812-28 ..... N82-11522 #
CONF-810812-30 ..... N82-11937 #
CONF-810812-31 ..... N82-11997 #
CONF-810826-1 ..... N82-11918 #
CONF-810831-2 ..... N82-11221 #
CONF-810831-5 ..... N82-11951 #
CONF-810902-1 ..... N82-11426 #
CONF-810902-3 ..... N82-11427 #
CONF-810902-4 ..... N82-11428 #
CONF-810903-1 ..... N82-11371 #
CONF-810906-1 ..... N82-11940 #
CONF-810906-2 ..... N82-11939 #
CONF-810908-1 ..... N82-11377 #
CONF-810910-1 ..... N82-11220 #
CONF-810912-3 ..... N82-11583 #
CONF-810912-4 ..... N82-11584 #
CONF-810912-6 ..... N82-11612 #
CONF-810912-8 ..... N82-11593 #
CONF-810912-10 ..... N82-11413 #
CONF-810913-1 ..... N82-11197 #
CONF-810913-2 ..... N82-11201 #

CONF-810913-4 ..... N82-11196 #
CONF-810918-1 ..... N82-11505 #
CONF-810920-1 ..... N82-11880 #
CONF-810923-1 ..... N82-11712 #
CONF-810923-2 ..... N82-11248 #
CONF-810925-1 ..... N82-11598 #
CONF-810925-2 ..... N82-11601 #
CONF-810925-3 ..... N82-11599 #
CONF-810925-4 ..... N82-11602 #
CONF-810925-6 ..... N82-11600 #
CONF-8007107-2 ..... N82-11574 #
CONF-8007109 ..... N82-11261 #
CONF-8008118-1 ..... N82-11580 #
CONF-8009131-2 ..... N82-11881 #
CONF-8009157 ..... N82-11874 #
CONF-8010159-12 ..... N82-11595 #
CONF-8010198-2 ..... N82-11731 #
CONF-8010203-2 ..... N82-11901 #
CONF-8010208-1 ..... N82-11902 #
CONF-8105103-1 ..... N82-11899 #
CONF-8105105-2 ..... N82-11582 #
CONF-8106100-3 ..... N82-11967 #
CONF-8106101-1 ..... N82-11429 #
CONF-8106105-2 ..... N82-11198 #
CONF-8106112-1 ..... N82-12006 #
CONF-8106112-2 ..... N82-12005 #
CONF-8106116-1 ..... N82-11946 #
CONF-8106125-1 ..... N82-11506 #
CONF-81080808 ..... N82-11611 #

CONTRIB-500 ..... N82-11537 #

COO-2119-24 ..... N82-11375 #
COO-3066-169 ..... N82-11882 #
COO-3335-28 ..... N82-11776 #
COO-4703-26 ..... N82-11501 #
COO-5002-22 ..... N82-11973 #

CORADCOM-79-0508-F ..... N82-11911 #

CRC-APRAC-CAPI-1-64-517 ..... N82-11175 #

CRC-TN-708-E ..... N82-11337 #

CSC/TM-80/6214 ..... N82-11103* #

CSIR-ME-1665 ..... N82-11508 #

CSIR-SR-FIS-209 ..... N82-11444 #

DELET-TR-77-0526F ..... N82-11365 #
DELET-TR-81-15 ..... N82-11962 #

DE81-017413 ..... N82-11377 #
DE81-023027 ..... N82-11612 #
DE81-023104 ..... N82-11580 #
DE81-023110 ..... N82-11970 #
DE81-023189 ..... N82-11777 #
DE81-023193 ..... N82-11157 #
DE81-023195 ..... N82-11587 #
DE81-023218 ..... N82-11416 #
DE81-023303 ..... N82-11201 #
DE81-023507 ..... N82-11874 #
DE81-023570 ..... N82-11996 #
DE81-023651 ..... N82-11506 #
DE81-023688 ..... N82-11379 #
DE81-023846 ..... N82-11901 #
DE81-023898 ..... N82-11881 #
DE81-023905 ..... N82-11902 #
DE81-023943 ..... N82-11880 #
DE81-023951 ..... N82-11425 #
DE81-024062 ..... N82-11200 #
DE81-024063 ..... N82-11854 #
DE81-024075 ..... N82-11429 #
DE81-024076 ..... N82-11423 #
DE81-024084 ..... N82-11420 #
DE81-024086 ..... N82-11421 #
DE81-024105 ..... N82-11896 #
DE81-024121 ..... N82-11422 #
DE81-024126 ..... N82-11424 #
DE81-024129 ..... N82-11907 #
DE81-024136 ..... N82-11419 #
DE81-024137 ..... N82-11586 #
DE81-024139 ..... N82-11418 #
DE81-024152 ..... N82-11590 #
DE81-024201 ..... N82-11473 #
DE81-024254 ..... N82-11948 #
DE81-024257 ..... N82-11412 #
DE81-024366 ..... N82-11219 #
DE81-024368 ..... N82-11583 #
DE81-024376 ..... N82-11378 #
DE81-024423 ..... N82-11442 #
DE81-024441 ..... N82-11974 #
DE81-024442 ..... N82-11115 #
DE81-024443 ..... N82-11953 #
DE81-024445 ..... N82-11409 #
DE81-024965 ..... N82-11415 #
DE81-024983 ..... N82-11417 #
DE81-025089 ..... N82-11575 #
DE81-025081 ..... N82-11584 #
DE81-025086 ..... N82-11414 #
DE81-025093 ..... N82-11897 #
DE81-025096 ..... N82-11160 #
DE81-025129 ..... N82-11972 #
DE81-025132 ..... N82-11239 #
DE81-025141 ..... N82-11797 #
DE81-025151 ..... N82-11882 #
DE81-025164 ..... N82-11196 #
DE81-025166 ..... N82-11237 #
DE81-025177 ..... N82-11574 #
DE81-025188 ..... N82-11886 #
DE81-025206 ..... N82-11879 #
DE81-025209 ..... N82-11593 #
DE81-025227 ..... N82-11441 #
DE81-025296 ..... N82-11903 #
DE81-025326 ..... N82-11877 #
DE81-025334 ..... N82-11971 #
DE81-025335 ..... N82-12006 #
DE81-025336 ..... N82-11262 #
DE81-025338 ..... N82-12005 #
DE81-025343 ..... N82-11048* #
DE81-025348 ..... N82-11945 #
DE81-025352 ..... N82-11884 #
DE81-025365 ..... N82-11461 #
DE81-025367 ..... N82-11373 #
DE81-025379 ..... N82-11598 #
DE81-025384 ..... N82-11591 #
DE81-025385 ..... N82-11885 #
DE81-025388 ..... N82-11946 #
DE81-025397 ..... N82-11887 #
DE81-025404 ..... N82-11908 #
DE81-025408 ..... N82-11944 #
DE81-025409 ..... N82-11066 #
DE81-025483 ..... N82-11193 #
DE81-025511 ..... N82-11522 #
DE81-025518 ..... N82-11240 #
DE81-025528 ..... N82-11581 #
DE81-025530 ..... N82-11372 #
DE81-025535 ..... N82-11199 #
DE81-025540 ..... N82-11973 #
DE81-025568 ..... N82-11954 #
DE81-025574 ..... N82-11375 #
DE81-025577 ..... N82-11918 #
DE81-025581 ..... N82-11198 #
DE81-025586 ..... N82-11324 #
DE81-025587 ..... N82-11577 #
DE81-025599 ..... N82-11936 #
DE81-025600 ..... N82-11898 #
DE81-025601 ..... N82-11873 #
DE81-025603 ..... N82-11374 #
DE81-025678 ..... N82-11194 #
DE81-025703 ..... N82-11605 #
DE81-025704 ..... N82-11608 #
DE81-025708 ..... N82-11611 #
DE81-025741 ..... N82-11150 #
DE81-025773 ..... N82-11597 #
DE81-025825 ..... N82-11878 #
DE81-025827 ..... N82-11161 #
DE81-025828 ..... N82-11474 #
DE81-025829 ..... N82-11463 #
DE81-025831 ..... N82-11256 #
DE81-025875 ..... N82-11114 #
DE81-025905 ..... N82-11607 #
DE81-025906 ..... N82-11609 #
DE81-025907 ..... N82-11610 #
DE81-025920 ..... N82-11937 #
DE81-025925 ..... N82-11900 #
DE81-025961 ..... N82-11167 #
DE81-025976 ..... N82-11997 #
DE81-025983 ..... N82-11252 #
DE81-025995 ..... N82-11221 #
DE81-025997 ..... N82-11714 #
DE81-026013 ..... N82-11265 #
DE81-026051 ..... N82-11775 #
DE81-026054 ..... N82-11853 #
DE81-026055 ..... N82-11413 #
DE81-026057 ..... N82-11875 #
DE81-026059 ..... N82-11589 #
DE81-026203 ..... N82-11947 #
DE81-026219 ..... N82-11553 #
DE81-026323 ..... N82-11909 #
DE81-026352 ..... N82-11163 #
DE81-026425 ..... N82-11988 #
DE81-026477 ..... N82-11248 #
DE81-026524 ..... N82-11941 #
DE81-026525 ..... N82-11942 #
DE81-026526 ..... N82-11883 #
DE81-026531 ..... N82-11899 #
DE81-026533 ..... N82-11264 #
DE81-026561 ..... N82-11904 #
DE81-026573 ..... N82-11810 #
DE81-026589 ..... N82-11938 #
DE81-026600 ..... N82-11247 #
DE81-026616 ..... N82-11813 #
DE81-026635 ..... N82-11602 #
DE81-026669 ..... N82-11814 #
DE81-026750 ..... N82-11588 #
DE81-026800 ..... N82-11596 #
DE81-026955 ..... N82-11604 #
DE81-027013 ..... N82-11852 #
DE81-027077 ..... N82-11322 #
DE81-027078 ..... N82-11321 #
DE81-027087 ..... N82-11895 #
DE81-027089 ..... N82-11969 #
DE81-027091 ..... N82-11595 #
DE81-027097 ..... N82-11967 #
DE81-027124 ..... N82-11876 #
DE81-027126 ..... N82-11376 #
DE81-027131 ..... N82-11712 #
DE81-027138 ..... N82-11317 #
DE81-027139 ..... N82-11238 #
DE81-027143 ..... N82-11251 #
DE81-027169 ..... N82-11943 #
DE81-027181 ..... N82-11976 #
DE81-027188 ..... N82-11318 #
DE81-027189 ..... N82-11323 #
DE81-027190 ..... N82-11319 #
DE81-027206 ..... N82-11893 #
DE81-027210 ..... N82-11411 #
DE81-027234 ..... N82-11557 #
DE81-027254 ..... N82-11558 #
DE81-027255 ..... N82-11159 #
DE81-027263 ..... N82-11731 #
DE81-027273 ..... N82-11812 #
DE81-027293 ..... N82-11325 #
DE81-027298 ..... N82-11462 #
DE81-027303 ..... N82-11582 #
DE81-027397 ..... N82-11594 #
DE81-027398 ..... N82-11811 #
DE81-027402 ..... N82-11645 #
DE81-027439 ..... N82-11603 #
DE81-027489 ..... N82-11616 #
DE81-027493 ..... N82-11842 #
DE81-027494 ..... N82-11648 #
DE81-027508 ..... N82-11846 #
DE81-027526 ..... N82-11613 #
DE81-027554 ..... N82-11968 #
DE81-027559 ..... N82-11504 #
DE81-027562 ..... N82-11236 #
DE81-027574 ..... N82-11249 #
DE81-027584 ..... N82-11250 #
DE81-027596 ..... N82-11950 #
DE81-027622 ..... N82-11158 #
DE81-027626 ..... N82-11949 #
DE81-027657 ..... N82-11460 #
DE81-027658 ..... N82-11916 #
DE81-027665 ..... N82-11951 #
DE81-027675 ..... N82-11154 #
DE81-027801 ..... N82-11266 #
DE81-027806 ..... N82-11952 #
DE81-027823 ..... N82-11562 #
DE81-027839 ..... N82-11649 #
DE81-027854 ..... N82-11585 #
DE81-027860 ..... N82-11905 #
DE81-027898 ..... N82-11776 #
DE81-027961 ..... N82-11242 #
DE81-028151 ..... N82-11599 #
DE81-028174 ..... N82-11560 #
DE81-028175 ..... N82-11561 #
DE81-028209 ..... N82-11168 #
DE81-028264 ..... N82-11647 #
DE81-028266 ..... N82-11263 #
DE81-028269 ..... N82-11906 #
DE81-028299 ..... N82-11243 #
DE81-028307 ..... N82-11234 #
DE81-028344 ..... N82-11316 #
DE81-028348 ..... N82-11642 #
DE81-028474 ..... N82-11169 #
DE81-028490 ..... N82-11519 #
DE81-028495 ..... N82-11579 #

DE81-028503 ..... N82-11644 #
DE81-028550 ..... N82-11592 #
DE81-028552 ..... N82-11646 #
DE81-028555 ..... N82-11643 #
DE81-028580 ..... N82-11255 #
DE81-028582 ..... N82-11148 #
DE81-028586 ..... N82-11796 #
DE81-028594 ..... N82-11162 #
DE81-028691 ..... N82-11917 #
DE81-028735 ..... N82-11600 #
DE81-028738 ..... N82-11601 #
DE81-028741 ..... N82-11919 #
DE81-028783 ..... N82-11320 #
DE81-028797 ..... N82-11606 #
DE81-028997 ..... N82-11459 #
DE81-029037 ..... N82-11404 #
DE81-029071 ..... N82-11641 #
DE81-029104 ..... N82-11894 #
DE81-029125 ..... N82-11166 #
DE81-029314 ..... N82-11233 #
DE81-029437 ..... N82-11935 #
DE81-029469 ..... N82-11713 #
DE81-029614 ..... N82-11258 #
DE81-029618 ..... N82-11564 #
DE81-029624 ..... N82-11572 #
DE81-029626 ..... N82-11381 #
DE81-029628 ..... N82-11268 #
DE81-029710 ..... N82-11932 #
DE81-029752 ..... N82-11570 #
DE81-029755 ..... N82-11191 #
DE81-029815 ..... N82-11933 #
DE81-029824 ..... N82-11565 #
DE81-029847 ..... N82-11795 #
DE81-029854 ..... N82-11995 #
DE81-029881 ..... N82-11576 #
DE81-029896 ..... N82-11892 #
DE81-029900 ..... N82-11458 #
DE81-029901 ..... N82-11934 #
DE81-029921 ..... N82-11773 #
DE81-029946 ..... N82-11192 #
DE81-029950 ..... N82-11476 #
DE81-029951 ..... N82-11518 #
DE81-029953 ..... N82-11190 #
DE81-029958 ..... N82-11246 #
DE81-029987 ..... N82-11245 #
DE81-029989 ..... N82-11573 #
DE81-029994 ..... N82-11617 #
DE81-030002 ..... N82-11152 #
DE81-030010 ..... N82-11915 #
DE81-030091 ..... N82-11045 #
DE81-030129 ..... N82-11044 #
DE81-030151 ..... N82-11149 #
DE81-030158 ..... N82-11235 #
DE81-030183 ..... N82-11253 #
DE81-030184 ..... N82-11254 #
DE81-030190 ..... N82-11475 #
DE81-030198 ..... N82-11244 #
DE81-030199 ..... N82-11155 #
DE81-030202 ..... N82-11521 #
DE81-030221 ..... N82-11368 #
DE81-030258 ..... N82-11845 #
DE81-030262 ..... N82-11151 #
DE81-030273 ..... N82-11164 #
DE81-030309 ..... N82-11407 #
DE81-030340 ..... N82-11153 #
DE81-030387 ..... N82-11503 #
DE81-030414 ..... N82-11408 #
DE81-030423 ..... N82-11218 #
DE81-030424 ..... N82-11410 #
DE81-030431 ..... N82-11640 #
DE81-030434 ..... N82-11774 #
DE81-030438 ..... N82-11439 #
DE81-030466 ..... N82-11841 #
DE81-030469 ..... N82-11619 #
DE81-030492 ..... N82-11165 #
DE81-030501 ..... N82-11891 #
DE81-030507 ..... N82-11563 #
DE81-030630 ..... N82-11555 #
DE81-030634 ..... N82-11267 #
DE81-030663 ..... N82-11872 #
DE81-030669 ..... N82-11554 #
DE81-030672 ..... N82-11621 #
DE81-030673 ..... N82-11620 #
DE81-030675 ..... N82-11818 #
DE81-030692 ..... N82-11137 #
DE81-030705 ..... N82-11405 #
DE81-030743 ..... N82-11650 #
DE81-030820 ..... N82-11618 #
DE81-030832 ..... N82-11559 #
DE81-030895 ..... N82-11523 #
DE81-030950 ..... N82-11380 #
DE81-030979 ..... N82-11241 #
DE81-030981 ..... N82-11569 #
DE81-030982 ..... N82-11566 #
DE81-030986 ..... N82-11567 #
DE81-030988 ..... N82-11355 #
DE81-030999 ..... N82-11370 #
DE81-031000 ..... N82-11651 #
DE81-031921 ..... N82-11568 #
DE81-031922 ..... N82-11440 #
DE81-031926 ..... N82-11556 #
DE81-032024 ..... N82-11715 #
DE81-903377 ..... N82-11615 #
DE81-903783 ..... N82-11406 #
DE81-904014 ..... N82-11520 #
DE81-904195 ..... N82-11382 #
DE81-904208 ..... N82-11217 #
DE81-904209 ..... N82-11369 #
DE81-904210 ..... N82-11383 #
DE81-904218 ..... N82-11502 #
DE81-904232 ..... N82-11507 #

DHHS/PUB/80-146 ..... N82-11673 #

DNA-5467F ..... N82-11354 #
DNA-5574T ..... N82-11437 #
DNA-5689F ..... N82-11710 #

DOE/AF-92005/T1 ..... N82-11235 #
DOE/AF-92016/T1 ..... N82-11234 #

DOE/CE-24390/1 ..... N82-11590 #

DOE/CS-20057/T4 ..... N82-11323 #
DOE/CS-20057/T5 ..... N82-11318 #
DOE/CS-20057/T6 ..... N82-11319 #
DOE/CS-20300/3 ..... N82-11246 #
DOE/CS-30139/T1 ..... N82-11425 #
DOE/CS-30174/T2-VOL-1 ..... N82-11618 #
DOE/CS-30292/3 ..... N82-11614 #
DOE/CS-30584/1 ..... N82-11324 #

DOE/DP-00789/T15 ..... N82-11044 #
DOE/DP-40083/9 ..... N82-11937 #
DOE/DP-40113/1 ..... N82-11458 #

DOE/EIS-0073-VOL-1 ..... N82-11252 #

DOE/EP-0022 ..... N82-11376 #

DOE/ER-00884/4 ..... N82-11895 #
DOE/ER-01198/1356 ..... N82-11198 #
DOE/ER-01198/1359 ..... N82-11918 #
DOE/ER-02119/24 ..... N82-11375 #
DOE/ER-04445/T2 ..... N82-11199 #
DOE/ER-05002/T2 ..... N82-11973 #
DOE/ER-10554/7 ..... N82-11114 #
DOE/ER-30010/1 ..... N82-11249 #

DOE/ET-10104/8 ..... N82-11268 #
DOE/ET-10517/T1 ..... N82-11236 #
DOE/ET-10746/T1 ..... N82-11156 #
DOE/ET-10805/T1-VOL-1 ..... N82-11947 #
DOE/ET-11056/T5 ..... N82-11158 #
DOE/ET-11343/T2 ..... N82-11571 #
DOE/ET-12056/25 ..... N82-11153 #
DOE/ET-12547/1 ..... N82-11145* #
DOE/ET-12548/9 ..... N82-11516* #
DOE/ET-12866/8-VOL-2 ..... N82-11616 #
DOE/ET-13032/2 ..... N82-11146* #
DOE/ET-14698/T6 ..... N82-11243 #
DOE/ET-14700/1 ..... N82-11259 #
DOE/ET-14700/2 ..... N82-11260 #
DOE/ET-15601/T3 ..... N82-11934 #
DOE/ET-20279/110 ..... N82-11603 #
DOE/ET-20279/133 ..... N82-11622 #
DOE/ET-20347/T1 ..... N82-11554 #
DOE/ET-28320/48 ..... N82-11585 #
DOE/ET-28359/T1 ..... N82-11404 #
DOE/ET-29335/T1 ..... N82-11381 #
DOE/ET-51002/1 ..... N82-11905 #
DOE/ET-51013/4 ..... N82-11906 #
DOE/ET-51013/8 ..... N82-11935 #
DOE/ET-51013/9 ..... N82-11933 #
DOE/ET-52048/17 ..... N82-11954 #
DOE/ET-53036/28 ..... N82-11932 #

DOE/EV-03335/T1 ..... N82-11776 #
DOE/EV-04498/1 ..... N82-11648 #
DOE/EV-12195/41 ..... N82-11731 #
DOE/FC-10193/T1 ..... N82-11642 #

DOE/FE-20036/1 ..... N82-11519 #
DOE/FE-20219/1 ..... N82-11237 #
DOE/FE-50135/2 ..... N82-11238 #

DOE/JPL-1012-57 ..... N82-11548* #
DOE/JPL-1060-43 ..... N82-11550* #
DOE/JPL-1060-49 ..... N82-11549* #

DOE/METC-SP-108 ..... N82-11251 #
DOE/METC-SP-110 ..... N82-11253 #
DOE/METC-SP-183 ..... N82-11254 #

DOE/NASA/0176-81/3 ..... N82-11545* #
DOE/NASA/0227-1 ..... N82-11466* #
DOE/NASA/1011-35 ..... N82-11184* #
DOE/NASA/51040/33 ..... N82-11993* #

DOE/PC-30021/T4 ..... N82-11168 #
DOE/PC-30041/T5 ..... N82-11167 #
DOE/PC-30041/T6 ..... N82-11166 #
DOE/PC-30080/4 ..... N82-11165 #
DOE/PC-30141/T4 ..... N82-11239 #
DOE/PC-30290/T3 ..... N82-11250 #
DOE/PC-30295/3 ..... N82-11641 #
DOE/PC-30304/2 ..... N82-11164 #
DOE/PC-30307/3 ..... N82-11242 #
DOE/PC-40265/1 ..... N82-11148 #

DOE/PE-0030 ..... N82-11613 #

DOE/RA-20029/T1 ..... N82-11523 #
DOE/RA-20223/T1 ..... N82-11240 #
DOE/RA-50146/1 ..... N82-11233 #

DOE/R5-10226/1 ..... N82-11380 #

DOE/TIC-11472 ..... N82-11909 #
DOE/TIC-1028580 ..... N82-11255 #

DOT-HS-805889 ..... N82-11092 #

DP-MS-81-31 ..... N82-11197 #

DPD-590 ..... N82-11889* #

DR-4 ..... N82-11889* #

DREV-R-4197/81 ..... N82-11456 #

DTNSRDC-81/067 ..... N82-11794 #

DTNSRDC/SME-80/46 ..... N82-11231 #

DYNATECH-2115 ..... N82-11243 #

D180-2595-4-VOL-2 ..... N82-11111* #
D180-25956-3-VOL-1 ..... N82-11110* #
D180-26426-2-VOL-2 ..... N82-11889* #

E-621 ..... N82-11397* #
E-668 ..... N82-11053* #
E-709 ..... N82-11211* #
E-922 ..... N82-11551* #
E-993 ..... N82-11183* #
E-995 ..... N82-11491* #
E-999 ..... N82-11182* #
E-1003 ..... N82-11107* #
E-1024 ..... N82-11106* #
E-1027 ..... N82-11043* #
E-1031 ..... N82-11042* #
E-1045 ..... N82-11117* #
E-1077 ..... N82-11184* #

EE.5E.81 ..... N82-11654 #

EGG-1183-1804 ..... N82-11846 #
EGG-2119 ..... N82-11521 #

EPA-AA-SDSB-81-4 ..... N82-11477 #

EPA-AA-TEB-511-81-7 ..... N82-11480 #
EPA-AA-TEB-511-81-10A ..... N82-11479 #
EPA-AA-TEB-511-81-10B ..... N82-11479 #

EPA-450/3-81-004 ..... N82-11662 #
EPA-450/4-81-017 ..... N82-11672 #
EPA-600/1-81-051 ..... N82-11779 #
EPA-600/1-81-052 ..... N82-11778 #

EPA-600/2-81-059 ..... N82-11171 #
EPA-600/2-81-110 ..... N82-11176 #
EPA-600/2-81-122 ..... N82-11663 #
EPA-600/3-81/039 ..... N82-11660 #
EPA-600/4-81-052 ..... N82-11671 #
EPA-600/4-81-060 ..... N82-11717 #
EPA-600/7-81-012C ..... N82-11679 #
EPA-600/7-81-039 ..... N82-11654 #
EPA-600/7-81-096 ..... N82-11661 #
EPA-600/7-81-098 ..... N82-11273 #
EPA-600/7-81-108 ..... N82-11656 #
EPA-600/14 ..... N82-11178 #
EPA-903/9-81-001 ..... N82-11678 #

EPRI-AP-1955 ..... N82-11217 #

EPRI-CS-1838 ..... N82-11406 #
EPRI-CS-1926 ..... N82-11193 #
EPRI-CS-1938 ..... N82-11507 #

EPRI-EA-1822 ..... N82-11643 #

EPRI-EL-1946 ..... N82-11369 #
EPRI-EL-1970-VOL-1 ..... N82-11382 #
EPRI-EL-1970-VOL-2 ..... N82-11383 #

EPRI-EM-1589-VOL-8 ..... N82-11620 #
EPRI-EM-1589-VOL-9-APP-C ..... N82-11621 #

EPRI-NP-81-10-LD ..... N82-11845 #
EPRI-NP-1931 ..... N82-11502 #

EPRI-RP-1441-1 ..... N82-11845 #

EPRI-TPS-79-740 ..... N82-11408 #

EPRI-WS-80-132 ..... N82-11261 #

ERSD-100-67-5 ..... N82-11329 #

ERT-P-7505-F ..... N82-11513* #

ERT-TR-A345-T1 ..... N82-11690* #

ESA-SP-143 ..... N82-12016* #

ESD-TR-81-87 ..... N82-11348 #

ESD-78-MSFC-2174 ..... N82-11544* #

ETI-CR81-984-VOL-1 ..... N82-11350 #
ETI-CR81-984-VOL-2 ..... N82-11351 #
ETI-CR81-984-VOL-3 ..... N82-11352 #

FAA-CT-81-58 ..... N82-11230* #

FAA-RD-81-25 ..... N82-11313 #
FAA-RD-81-76 ..... N82-11047 #

FDA/ACPE-81/95 ..... N82-11998 #

FDRL-81-7 ..... N82-11071* #

FE-1540-29-VOL-1 ..... N82-11947 #
FE-30290-3Q ..... N82-11250 #

FEL-422.9 ..... N82-11326 #

FHWA/MC-81/002 ..... N82-11329 #

FHWA/OK-81/3 ..... N82-11330 #

FHWA/VA-81/48 ..... N82-11332 #

FOA-C-30171-EL ..... N82-11758* #

FPCD-81-43 ..... N82-11979 #

FR-10066 ..... N82-11546* #

FRR-182 ..... N82-11041* #

FSRP/INT-274 ..... N82-11750 #

FTD-ID(RS)T-0570-81 ..... N82-11023* #
FTD-ID(RS)T-0704-81 ..... N82-11014 #
FTD-ID(RS)T-0705-81 ..... N82-12021 #
FTD-ID(RS)T-0706-81 ..... N82-11019 #

F78-11-REV-A ..... N82-11511* #

GA-A-16134 ..... N82-11813 #
GA-A-16222 ..... N82-11904 #

GALCIT-SM-81-7 ..... N82-11494 #

GCA-TR-80-126-G ..... N82-11672 #

GER-17020 ..... N82-11801* #

GR-8 ..... N82-11278 #
GR-8 ..... N82-11433 #
GR-8 ..... N82-11464 #
GR-10 ..... N82-11277 #

GRI-80/0013.1 ..... N82-11657 #
GRI-80/0013.2 ..... N82-11274 #
GRI-80/0033 ..... N82-11271 #
GRI-80/0037 ..... N82-11202 #
GRI-80/0053 ..... N82-11478 #

GULF-627RM073 ..... N82-11242 #

HAC-D6210 ..... N82-11062 #

HDL-TR-1927 ..... N82-11931 #
HDL-TR-1944 ..... N82-11914 #

HEDL-SA-2257-FP ..... N82-11191 #
HEDL-SA-2325-FP ..... N82-11896 #

ID-05R-1180 ..... N82-11048 #

IDL/R/D-80 ..... N82-11272 #

IITRI-M06055-10 ..... N82-11207* #

IPPJ-REV-1 ..... N82-11924 #

IPPJ-530 ..... N82-11925 #
IPPJ-531 ..... N82-11926 #
IPPJ-532 ..... N82-11927 #
IPPJ-533 ..... N82-11928 #
IPPJ-534 ..... N82-11929 #

IR-1 ..... N82-11064 #
IR-3 ..... N82-11065 #

IS-M-297 ..... N82-11372 #
IS-M-352 ..... N82-11581 #

IS-T-914 ..... N82-11650 #

ISBN-0-626-05677-2 ..... N82-11277 #
ISBN-0-626-05679-9 ..... N82-11464 #
ISBN-0-626-05688-8 ..... N82-11433 #
ISBN-0-626-05710-8 ..... N82-11278 #
ISBN-0-7988-169-1 ..... N82-11508 #
ISBN-0-7988-1904-9 ..... N82-11444 #
ISBN-92-835-1391-6 ..... N82-11073 #
ISBN-92-835-1397-5 ..... N82-11056 #

ISSN-0389-4-10 ..... N82-11034 #
ISSN-0389-4010 ..... N82-11067 #
ISSN-0389-4010 ..... N82-11358 #
ISSN-0389-4010 ..... N82-11826 #
ISSN-3989-4010 ..... N82-11035 #

ITR-1 ..... N82-11912 #

IWS-52.3 ..... N82-11780 #

JHU/APL/EQR/81-1 ..... N82-11535 #

JPL-PUB-81-16 ..... N82-11209* #
JPL-PUB-81-27 ..... N82-11550* #
JPL-PUB-81-45 ..... N82-11146* #
JPL-PUB-81-48 ..... N82-11098* #
JPL-PUB-81-60 ..... N82-11435* #
JPL-PUB-81-73 ..... N82-11341* #
JPL-PUB-81-74 ..... N82-11516* #
JPL-PUB-81-75 ..... N82-11994* #
JPL-PUB-81-76 ..... N82-11548* #
JPL-PUB-81-80 ..... N82-12015* #
JPL-PUB-81-82 ..... N82-11145* #
JPL-PUB-81-84 ..... N82-11340* #
JPL-PUB-81-85 ..... N82-11549* #
JPL-PUB-81-90 ..... N82-11095* #

JPRS-78932 ..... N82-11446 #
JPRS-79338 ..... N82-11762

J206-81-005-FR ..... N82-11492* #

K/ET-5013-ADD-1 ..... N82-11441 #
K/ET-5013-REV-1 ..... N82-11442 #
K/ET-5014-REV-2 ..... N82-11409 #

KMSF-U-1087 ..... N82-11943 #
KMSF-U-1097 ..... N82-11936 #

KU-FRL-464-3 ..... N82-11052* #

L-13950 ..... N82-11489* #
L-14423 ..... N82-11391* #
L-14533 ..... N82-11488* #
L-14575 ..... N82-11013* #
L-14606 ..... N82-11050* #
L-14666 ..... N82-11033* #
L-14695 ..... N82-11090* #
L-14746 ..... N82-11032* #

LA-TR-81-19 ..... N82-11473 #
LA-TR-81-22 ..... N82-11459 #

LA-UR-81-909 ..... N82-11426 #
LA-UR-81-969 ..... N82-11427 #
LA-UR-81-1414 ..... N82-11428 #
LA-UR-81-1671 ..... N82-11591 #
LA-UR-81-1694 ..... N82-11885 #
LA-UR-81-1697 ..... N82-11946 #
LA-UR-81-1748 ..... N82-11066 #
LA-UR-81-1750 ..... N82-11944 #
LA-UR-81-1860 ..... N82-11945 #
LA-UR-81-1873 ..... N82-11884 #
LA-UR-81-1882 ..... N82-11046* #
LA-UR-81-1897 ..... N82-11971 #
LA-UR-81-1906 ..... N82-11262 #
LA-UR-81-1907 ..... N82-12006 #
LA-UR-81-1908 ..... N82-12005 #
LA-UR-81-1928 ..... N82-11373 #
LA-UR-81-1936 ..... N82-11461 #
LA-UR-81-2003 ..... N82-11598 #
LA-UR-81-2136 ..... N82-11919 #
LA-UR-81-2186 ..... N82-11602 #
LA-UR-81-2206 ..... N82-11601 #
LA-UR-81-2251 ..... N82-11600 #
LA-UR-81-2252 ..... N82-11599 #

LA-8790 ..... N82-11162 #
LA-8804-MS ..... N82-11814 #
LA-8849-MS ..... N82-11796 #
LA-8875 ..... N82-11408 #
LA-8904-PR ..... N82-11891 #
LA-8906-MS ..... N82-11988 #
LA-8921-MS ..... N82-11503 #
LA-8930-MS ..... N82-11439 #
LA-8954-MS ..... N82-11715 #

LBL-11090 ..... N82-11595 #
LBL-11703 ..... N82-11592 #
LBL-12177 ..... N82-11192 #
LBL-12289 ..... N82-11195 #
LBL-12370 ..... N82-11795 #
LBL-12492 ..... N82-11811 #
LBL-12625 ..... N82-11194 #
LBL-12640 ..... N82-11995 #
LBL-12678 ..... N82-11161 #
LBL-12690 ..... N82-11594 #
LBL-12751 ..... N82-11593 #
LBL-12779 ..... N82-11646 #
LBL-12801 ..... N82-11879 #
LBL-12807 ..... N82-11474 #
LBL-12814 ..... N82-11877 #
LBL-12822 ..... N82-11968 #
LBL-12852 ..... N82-11969 #
LBL-12855 ..... N82-11878 #
LBL-12877 ..... N82-11256 #
LBL-12930 ..... N82-11967 #
LBL-12963 ..... N82-11645 #
LBL-13178 ..... N82-11872 #

LC-81-600047 ..... N82-11177 #
LC-81-600052 ..... N82-11975 #

LIDS-P-1131 ..... N82-11349 #
LIDS-P-1135 ..... N82-11791 #
LIDS-P-1140 ..... N82-11844 #

LMF-85 ..... N82-11651 #

LMSC-D802558 ..... N82-11706 #

LPI-TR-81-04 ..... N82-11691* #

LR-1029-REV-A ..... N82-11455 #
LR-29935-VOL-1 ..... N82-11224* #

M-360 ..... N82-11784* #

MASEC-PA-80-007 ..... N82-11316 #

MDC-G9490 ..... N82-11565 #

MLM-2850 ..... N82-11218 #

MTI82-TR-4 ..... N82-11466* #

MTP-81W0002 ..... N82-11626 #

NADC-79021-60 ..... N82-11055 #
NADC-80254-60 ..... N82-11063 #

NAL-TR-427T ..... N82-11067 #
NAL-TR-655 ..... N82-11826 #
NAL-TR-656 ..... N82-11358 #
NAL-TR-661T ..... N82-11035 #
NAL-TR-667T ..... N82-11034 #

NASA-CASE-FRC-11074-1 ..... N82-11436* #

NASA-CASE-GSC-12567-1 ..... N82-11359* #
NASA-CASE-GSC-12697-1 ..... N82-11312* #

NASA-CASE-LAR-12532-1 ..... N82-11088*
NASA-CASE-LAR-12552-1 ..... N82-11431*
NASA-CASE-LAR-12640-1 ..... N82-11206*

NASA-CASE-LEW-12950-1 ..... N82-11399* #
NASA-CASE-LEW-13080-2 ..... N82-11210* #

NASA-CASE-MFS-23250-1 ..... N82-11432*
NASA-CASE-MFS-25306-1 ..... N82-11147* #
NASA-CASE-MFS-25510-1 ..... N82-11470* #
NASA-CASE-MFS-25586-1 ..... N82-11360* #
NASA-CASE-MFS-25620-1 ..... N82-11118* #

NASA-CASE-MSC-14836-1 ..... N82-11770*
NASA-CASE-MSC-18106-1 ..... N82-11357*
NASA-CASE-MSC-18606-1 ..... N82-11336*

NASA-CASE-NPO-13877-1 ..... N82-11634*
NASA-CASE-NPO-14273-1 ..... N82-11144*
NASA-CASE-NPO-15295-1 ..... N82-11785* #
NASA-CASE-NPO-15522-1 ..... N82-11861* #
NASA-CASE-NPO-15539-1 ..... N82-11469* #

NASA-CP-2147-SUPPL ..... N82-11489* #

NASA-CR-3470 ..... N82-11859* #
NASA-CR-3471 ..... N82-11031* #
NASA-CR-3473 ..... N82-11688* #
NASA-CR-3475 ..... N82-11116* #
NASA-CR-3477 ..... N82-11452* #
NASA-CR-145374 ..... N82-11635* #
NASA-CR-161882 ..... N82-11862* #
NASA-CR-161883 ..... N82-11544* #
NASA-CR-161885 ..... N82-11040* #
NASA-CR-161886 ..... N82-11490* #
NASA-CR-161887 ..... N82-11181* #
NASA-CR-161888 ..... N82-11889* #
NASA-CR-161891 ..... N82-11958* #
NASA-CR-161892 ..... N82-11094* #
NASA-CR-161907 ..... N82-11207* #
NASA-CR-164614 ..... N82-11492* #
NASA-CR-164916 ..... N82-11121* #
NASA-CR-164929 ..... N82-11493* #
NASA-CR-164930 ..... N82-12010* #
NASA-CR-164931 ..... N82-11514* #
NASA-CR-164936 ..... N82-11395* #
NASA-CR-164937 ..... N82-11724* #
NASA-CR-164938 ..... N82-11394* #
NASA-CR-164939 ..... N82-11279* #
NASA-CR-164942 ..... N82-11393* #
NASA-CR-164943 ..... N82-11694* #
NASA-CR-164944 ..... N82-11691* #
NASA-CR-164945 ..... N82-11548* #
NASA-CR-164946 ..... N82-12015* #
NASA-CR-164947 ..... N82-11095* #
NASA-CR-164948 ..... N82-11098* #
NASA-CR-164949 ..... N82-11146* #
NASA-CR-164950 ..... N82-11435* #
NASA-CR-164951 ..... N82-11208* #
NASA-CR-164952 ..... N82-11039* #
NASA-CR-164953 ..... N82-11396* #
NASA-CR-164954 ..... N82-11341* #
NASA-CR-164955 ..... N82-11549* #
NASA-CR-164956 ..... N82-11340* #
NASA-CR-164957 ..... N82-11145* #
NASA-CR-164958 ..... N82-11994* #
NASA-CR-164959 ..... N82-11209* #
NASA-CR-164960 ..... N82-11550* #
NASA-CR-164961 ..... N82-11516* #
NASA-CR-164964 ..... N82-11695* #
NASA-CR-164965 ..... N82-11698* #
NASA-CR-164966 ..... N82-11052* #
NASA-CR-164967 ..... N82-12020* #
NASA-CR-164968 ..... N82-11696* #
NASA-CR-164969 ..... N82-12004* #
NASA-CR-164970 ..... N82-11100* #
NASA-CR-164971 ..... N82-11099* #
NASA-CR-164972 ..... N82-11959* #
NASA-CR-165258 ..... N82-11230* #
NASA-CR-165283 ..... N82-11546* #
NASA-CR-165379 ..... N82-11465* #
NASA-CR-165391 ..... N82-11224* #
NASA-CR-165470 ..... N82-11068* #
NASA-CR-165471 ..... N82-11041* #
NASA-CR-165479 ..... N82-11466* #
NASA-CR-165487 ..... N82-11468* #
NASA-CR-165502-VOL-1 ..... N82-11110* #
NASA-CR-165502-VOL-2 ..... N82-11111* #
NASA-CR-165505 ..... N82-11545* #
NASA-CR-165508 ..... N82-11547* #
NASA-CR-165530 ..... N82-11390* #
NASA-CR-165531 ..... N82-11467* #
NASA-CR-165683 ..... N82-11453* #
NASA-CR-165772 ..... N82-11070* #
NASA-CR-165781 ..... N82-11723* #
NASA-CR-165788 ..... N82-11833* #
NASA-CR-165789 ..... N82-11834* #
NASA-CR-165791 ..... N82-11515* #
NASA-CR-166228 ..... N82-11991* #
NASA-CR-166229 ..... N82-11992* #
NASA-CR-166708 ..... N82-11510* #
NASA-CR-166711 ..... N82-11338* #
NASA-CR-166712 ..... N82-11690* #
NASA-CR-166713 ..... N82-11105* #
NASA-CR-166715 ..... N82-12019* #
NASA-CR-166716 ..... N82-11800* #
NASA-CR-166720-VOL-1 ..... N82-11511* #
NASA-CR-166721 ..... N82-11512* #
NASA-CR-166724 ..... N82-11513* #
NASA-CR-166726 ..... N82-11801* #
NASA-CR-166728 ..... N82-11101* #
NASA-CR-166737 ..... N82-11103* #

NASA-SP-5108 ..... N82-11858* #
NASA-SP-7039(19)-SEC-1 ..... N82-11981*
NASA-SP-7039(19)-SEC-2 ..... N82-11982*
NASA-SP-7046(05) N82-11093*

NASA-TM-76520 ..... N82-11771* #
NASA-TM-76599 ..... N82-11119* #
NASA-TM-76604 ..... N82-11096* #
NASA-TM-76608 ..... N82-11120* #
NASA-TM-76609 ..... N82-11225* #
NASA-TM-76610 ..... N82-11223* #
NASA-TM-76612 ..... N82-12016* #
NASA-TM-76614 ..... N82-11697* #
NASA-TM-76617 ..... N82-11725* #
NASA-TM-76620 ..... N82-11180* #
NASA-TM-76623 ..... N82-11185* #
NASA-TM-76624 ..... N82-11186* #
NASA-TM-76626 ..... N82-11758* #
NASA-TM-76628 ..... N82-11636* #
NASA-TM-76717 ..... N82-11759* #
NASA-TM-76719 ..... N82-11097* #
NASA-TM-76726 ..... N82-11757* #
NASA-TM-76729 ..... N82-11760* #
NASA-TM-76730 ..... N82-11989* #
NASA-TM-81300 ..... N82-11398* #
NASA-TM-81331 ..... N82-11054* #
NASA-TM-81334 ..... N82-11018* #
NASA-TM-81616 ..... N82-11397* #
NASA-TM-81651 ..... N82-11053* #
NASA-TM-81746 ..... N82-11211* #
NASA-TM-81928 ..... N82-11817* #
NASA-TM-82444 ..... N82-11311* #
NASA-TM-82685 ..... N82-11551* #
NASA-TM-82706 ..... N82-11183* #
NASA-TM-82710 ..... N82-11107* #
NASA-TM-82713 ..... N82-11491* #
NASA-TM-82715 ..... N82-11182* #
NASA-TM-82723 ..... N82-11106* #
NASA-TM-82725 ..... N82-11043* #
NASA-TM-82727 ..... N82-11993* #
NASA-TM-82728 ..... N82-11042* #
NASA-TM-82733 ..... N82-11117* #
NASA-TM-82758 ..... N82-11184* #
NASA-TM-83181 ..... N82-11816* #
NASA-TM-83193 ..... N82-11051* #
NASA-TM-83205 ..... N82-11434* #
NASA-TM-83212 ..... N82-11339* #
NASA-TM-83214 ..... N82-11860* #
NASA-TM-84049 ..... N82-11046* #
NASA-TM-84063 ..... N82-11102* #

NASA-TP-1902 ..... N82-11391* #
NASA-TP-1903 ..... N82-11488* #
NASA-TP-1914 ..... N82-11013* #
NASA-TP-1918 ..... N82-11050* #
NASA-TP-1919 ..... N82-11033* #
NASA-TP-1923 ..... N82-11090* #
NASA-TP-1932 ..... N82-11784* #
NASA-TP-1934 ..... N82-11032* #
NASA-TP-1939 ..... N82-11109* #

NBS-GCR-ETIP-81-93-VOL-6 ..... N82-11664 #
NBS-GCR-ETIP-81-94-VOL-7 ..... N82-11665 #
NBS-GCR-ETIP-81-95 ..... N82-11666 #

NBS-SP-400-64 ..... N82-11975 #
NBS-SP-400-69 ..... N82-11384 #
NBS-SP-604 ..... N82-11177 #

NBS-TN-270-8 ..... N82-11170 #
NBS-TN-1038 ..... N82-11920 #

NBSIR-81-2276 ..... N82-11172 #
NBSIR-81-2280 ..... N82-11677 #
NBSIR-81-2293 ..... N82-11173 #

NCAR-CT-60 ..... N82-12018 #
NCAR-CT-61 ..... N82-11732 #

NCAR/AR-80 ..... N82-11692 #

NCAR/TN-160 ..... N82-11739 #
NCAR/TN-164+EDD ..... N82-11736 #
NCAR/TN-170 ..... N82-12017 #

NCEI-0031 ..... N82-11615 #

NCHSR-81-144 ..... N82-11987 #

NMERI-AP-37 ..... N82-11313 #

NOAA-TM-ERL-ARL-96 ..... N82-11748 #
NOAA-TM-ERL-ARL-98 ..... N82-11733 #

NOAA-TM-ERL-PMEL-24 ..... N82-11537 #
NOAA-TM-ERL-PMEL-25 ..... N82-11745 #

NOAA-TM-ERL-RFC-7 ..... N82-11743 #

NOAA-TM-ERL-WPL-69 ..... N82-11740 #
NCAA-TM-ERL-WPL-70 ..... N82-11742 #

NOAA-TM-NOS-NGS-31 ..... N82-11744 #

NOAA-TM-NWS-WR-162 ..... N82-11530 #
NOAA-TM-NWS-WR-163 ..... N82-11746 #

NOAA-TM-OMPA-3 ..... N82-11669 #
NOAA-TM-OMPA-5 ..... N82-11753 #

NOAA-81042201 ..... N82-11670 #
NOAA-81042701 ..... N82-11669 #
NOAA-81042703 ..... N82-11753 #
NOAA-81042704 ..... N82-11748 #
NOAA-81042706 ..... N82-11536 #
NOAA-81042801 ..... N82-11749 #
NOAA-81042910 ..... N82-11754 #
NOAA-81043005 ..... N82-11537 #
NOAA-81050604 ..... N82-11735 #
NOAA-81050610 ..... N82-11740 #
NOAA-81050611 ..... N82-11733 #
NOAA-81050703 ..... N82-11530 #
NOAA-81050810 ..... N82-11741 #
NOAA-81051111 ..... N82-11744 #
NOAA-81051402 ..... N82-11746 #
NOAA-81051408 ..... N82-11747 #

NOAA-81051409 ..... N82-11742 #
NOAA-81051503 ..... N82-11743 #
NOAA-81051504 ..... N82-11745 #

NOSC/TD-464 ..... N82-11772 #

NP-1904014 ..... N82-11520 #

NPS52-81-012-PT-1 ..... N82-11805 #
NPS52-81-013 ..... N82-11809 #
NPS68-81-005 ..... N82-11729 #

NRL-MR-4468 ..... N82-11364 #
NRL-MR-4619 ..... N82-11871 #

NRL-4625 ..... N82-11472 #
NRL-8495 ..... N82-11787 #
NRL-8510 ..... N82-11346 #
NRL-8517 ..... N82-11838 #

NSF/PRA-80-SP-1187 ..... N82-11623 #

NSF/RA-800488 ..... N82-11978 #
NSF/RA-800526 ..... N82-11328 #
NSF/RA-800544 ..... N82-11752 #

NSWC/TR-78-143 ..... N82-11730 #
NSWC/TR-80-343 ..... N82-11212 #
NSWC/TR-81-213-PT-1 ..... N82-11788 #

NTIA-CR-80-9 ..... N82-11356 #

NYSERDA-80-24 ..... N82-11625 #
NYSERDA-81-2 ..... N82-11624 #
NYSERDA-81-7 ..... N82-11275 #

O-492-206-81-04 ..... N82-11102* #

ONERA-TP-1979-134 ..... N82-11487

ORNL-TR-4764 ..... N82-11976 #

ORNL-5692 ..... N82-11774 #
ORNL-5777 ..... N82-11949 #

ORNL/CON-59 ..... N82-11555 #

ORNL/CSD-79 ..... N82-11841 #
ORNL/CSD-81 ..... N82-11410 #

ORNL/MIT-331 ..... N82-11154 #

ORNL/SUB-80/61602/1 ..... N82-11321 #
ORNL/SUB-7605-12-2 ..... N82-11892 #

ORNL/TM-7438-VOL-2 ..... N82-11619 #
ORNL/TM-7511 ..... N82-11845 #
ORNL/TM-7640 ..... N82-11322 #
ORNL/TM-7744 ..... N82-11640 #
ORNL/TM-7770 ..... N82-11894 #
ORNL/TM-7803 ..... N82-11950 #
ORNL/TM-7847 ..... N82-11151 #
ORNL/TM-7852 ..... N82-11405 #

ORP-LVF-81-2 ..... N82-11659 #

OSU-CISRC-TR-81-8 ..... N82-11790 #

OWRT-A-015-WYO(3) ..... N82-11443 #

OWRT-B-123-SC(1) ..... N82-11668 #

PB81-170672 ..... N82-11984 #
PB81-212037 ..... N82-11658 #
PB81-212243 ..... N82-11980 #
PB81-213795 ..... N82-11659 #
PB81-214645 ..... N82-11983 #
PB81-214868 ..... N82-11222 #
PB81-215907 ..... N82-12011 #
PB81-216053 ..... N82-11272 #
PB81-216095 ..... N82-11269 #
PB81-216103 ..... N82-11270 #
PB81-216111 ..... N82-11524 #
PB81-216129 ..... N82-11525 #
PB81-217077 ..... N82-11528 #
PB81-217952 ..... N82-11092 #
PB81-217986 ..... N82-11978 #
PB81-218117 ..... N82-11665 #
PB81-218141 ..... N82-11535 #
PB81-218273 ..... N82-11666 #
PB81-218372 ..... N82-11329 #
PB81-218547 ..... N82-11443 #
PB81-219081 ..... N82-11716 #
PB81-219172 ..... N82-11326 #
PB81-219339 ..... N82-11672 #
PB81-219537 ..... N82-11660 #
PB81-219594 ..... N82-11661 #
PB81-219610 ..... N82-11734 #
PB81-219735 ..... N82-11327 #
PB81-219966 ..... N82-11979 #
PB81-220048 ..... N82-11662 #
PB81-220139 ..... N82-11740 #
PB81-220147 ..... N82-11754 #
PB81-220188 ..... N82-11537 #
PB81-220733 ..... N82-11384 #
PB81-220782 ..... N82-11752 #
PB81-220790 ..... N82-11328 #
PB81-221012 ..... N82-11733 #
PB81-221251 ..... N82-11175 #
PB81-221301 ..... N82-11273 #
PB81-221327 ..... N82-11975 #
PB81-221434 ..... N82-11173 #
PB81-221467 ..... N82-11534 #
PB81-221509 ..... N82-11356 #
PB81-221533 ..... N82-11533 #
PB81-221608 ..... N82-11732 #
PB81-221616 ..... N82-11664 #
PB81-221632 ..... N82-11739 #
PB81-221863 ..... N82-11663 #
PB81-221889 ..... N82-11656 #
PB81-222200 ..... N82-11735 #
PB81-222267 ..... N82-11654 #
PB81-222291 ..... N82-11271 #
PB81-222309 ..... N82-11657 #
PB81-222317 ..... N82-11274 #
PB81-222333 ..... N82-11671 #
PB81-222382 ..... N82-11778 #
PB81-222408 ..... N82-11779 #
PB81-222424 ..... N82-11623 #
PB81-222612 ..... N82-11652 #
PB81-222721 ..... N82-11171 #
PB81-222754 ..... N82-11627 #
PB81-222762 ..... N82-11737 #
PB81-222770 ..... N82-11738 #
PB81-222804 ..... N82-11655 #
PB81-222820 ..... N82-11653 #
PB81-222846 ..... N82-11508 #
PB81-222853 ..... N82-11444 #
PB81-222895 ..... N82-12018 #
PB81-222903 ..... N82-12017 #
PB81-222937 ..... N82-11736 #
PB81-223299 ..... N82-11717 #
PB81-223372 ..... N82-11478 #
PB81-223463 ..... N82-11170 #
PB81-223612 ..... N82-11526 #
PB81-223752 ..... N82-11532 #
PB81-223836 ..... N82-11536 #
PB81-223885 ..... N82-11799 #
PB81-223950 ..... N82-11750 #
PB81-224057 ..... N82-11670 #
PB81-224107 ..... N82-11669 #
PB81-224115 ..... N82-11753 #
PB81-224131 ..... N82-11749 #
PB81-224172 ..... N82-11748 #
PB81-224180 ..... N82-11527 #
PB81-224198 ..... N82-11747 #
PB81-224214 ..... N82-11049 #
PB81-224263 ..... N82-11531 #
PB81-224297 ..... N82-11668 #
PB81-224313 ..... N82-11667 #
PB81-224412 ..... N82-11538 #
PB81-224495 ..... N82-11530 #
PB81-224537 ..... N82-11276 #
PB81-224610 ..... N82-11920 #
PB81-224982 ..... N82-11477 #
PB81-225286 ..... N82-11675 #
PB81-225294 ..... N82-11676 #
PB81-225377 ..... N82-11673 #
PB81-225393 ..... N82-11746 #
PB81-225401 ..... N82-11745 #
PB81-225435 ..... N82-11744 #
PB81-225468 ..... N82-11743 #
PB81-225476 ..... N82-11742 #
PB81-225518 ..... N82-11529 #
PB81-225575 ..... N82-11741 #
PB81-225757 ..... N82-11543 #
PB81-225773 ..... N82-11679 #
PB81-225872 ..... N82-11782 #
PB81-225880 ..... N82-11783 #
PB81-225948 ..... N82-11985 #
PB81-226052 ..... N82-11626 #
PB81-226078 ..... N82-11678 #
PB81-226110 ..... N82-11674 #
PB81-226185 ..... N82-11178 #
PB81-226250 ..... N82-11174 #
PB81-226334 ..... N82-11177 #
PB81-226425 ..... N82-11798 #
PB81-226722 ..... N82-11331 #
PB81-226771 ..... N82-11542 #
PB81-226789 ..... N82-11541 #
PB81-226813 ..... N82-11625 #
PB81-226862 ..... N82-11624 #
PB81-226870 ..... N82-11333 #
PB81-226979 ..... N82-11275 #
PB81-227233 ..... N82-11987 #
PB81-227290 ..... N82-11998 #
PB81-227340 ..... N82-11540 #
PB81-227373 ..... N82-11628 #
PB81-227738 ..... N82-11332 #
PB81-227860 ..... N82-11677 #
PB81-227902 ..... N82-11392* #
PB81-227993 ..... N82-11202 #
PB81-228009 ..... N82-11986 #
PB81-228207 ..... N82-11761 #
PB81-228249 ..... N82-11539 #
PB81-228256 ..... N82-11480 #
PB81-229171 ..... N82-11172 #
PB81-229692 ..... N82-11780 #
PB81-229866 ..... N82-11479 #
PB81-231607 ..... N82-11330 #
PB81-234262 ..... N82-11176 #

PFC/RR-80-17 ..... N82-11905 #
PFC/RR-81-2R ..... N82-11906 #
PFC/RR-81-6 ..... N82-11935 #

PHM-01-81 ..... N82-11707 #

PNL-SA-8768 ..... N82-11411 #

PNL-3801 ..... N82-11149 #
PNL-3883 ..... N82-11320 #
PNL-3951 ..... N82-11258 #

POLY-M/AE-81-8 ..... N82-11158 #

PPPL-1801 ..... N82-11462 #

PR-3 ..... N82-11913 #

PRI-20-VOL-1 ..... N82-11955 #

PRR-80/21 ..... N82-11905 #

PRRL-81-CR-12 ..... N82-11452* #

PSU-TURBO-R81-3 ..... N82-11031* #

PWA-5515-162 ..... N82-11467* #
PWA-5697-29 ..... N82-11230* #

QPR-4 ..... N82-11345 #

QR-1 ..... N82-11148 #
QR-2 ..... N82-11164 #
QR-3 ..... N82-11641 #
QR-10 ..... N82-11577 #

QTPR-2 ..... N82-11557 #
QTPR-3 ..... N82-11242 #
QTPR-3 ..... N82-11558 #

R-81-130 ..... N82-11827 #
R-381 ..... N82-11331 #

RADC-TR-80-307 ..... N82-11344 #
RADC-TR-80-313 ..... N82-11347 #
RADC-TR-81-30 ..... N82-11362 #
RADC-TR-81-66 ..... N82-11367 #
RADC-TR-81-98 ..... N82-11343 #
RADC-TR-81-167 ..... N82-11135 #
RADC-TR-81-168 ..... N82-11363 #
RADC-TR-81-169 ..... N82-11965 #
RADC-TR-81-179 ..... N82-11104 #
RADC-TR-81-180 ..... N82-11963 #
RADC-TR-81-184 ..... N82-11366 #

RAE-LIB-TRANS-2017 ..... N82-11766
RAE-LIB-TRANS-2050 ..... N82-11030 #
RAE-LIB-TRANS-2052 ..... N82-11205 #

RAE-LIB-TRANS-2056 ..... N82-11487
RAE-LIB-TRANS-2057 ..... N82-11486
RAE-LIB-TRANS-2058 ..... N82-11335
RAE-LIB-TRANS-2059 ..... N82-11389
RAE-LIB-TRANS-2061 ..... N82-11029
RAE-LIB-TRANS-2064 ..... N82-11089
RAE-LIB-TRANS-2065 ..... N82-11767
RAE-LIB-TRANS-2066 ..... N82-11179

RDA-TR-113204-004 ..... N82-11437 #

REC-ERC-80-8 ..... N82-11392* #

REPT-3 ..... N82-11909 #
REPT-24/81 ..... N82-12011 #
REPT-80-24 ..... N82-11625 #
REPT-81-7 ..... N82-11275 #
REPT-81-10 ..... N82-11851 #
REPT-365-81 ..... N82-11517 #
REPT-811 ..... N82-11863 #
REPT-995 ..... N82-11068* #
REPT-7967-15-DEG ..... N82-11364 #
REPT-8100-FB-0003 ..... N82-11571 #
REPT-351710-6028-UT-01 ..... N82-11116* #
REPT-0189219-1-F ..... N82-11728* #

RFP-3188 ..... N82-11159 #

RI/RD81-149 ..... N82-11465* #
RI/RD81-199 ..... N82-11468* #

RI/1/80 ..... N82-11983 #

RM-81-3 ..... N82-11839 #

RSED-81319 ..... N82-11804 #

RSL-TR-410-2 ..... N82-11510* #

RTI/1934/00-01F ..... N82-11661 #
RTI/1934/00-03F ..... N82-11273 #

SABS-809-1980 ..... N82-11278 #
SABS-1304-1980 ..... N82-11277 #
SABS-1312-1980 ..... N82-11464 #
SABS-1317-1980 ..... N82-11433 #

SAI-254-80-656-LJ-VOL-1 ..... N82-11955 #
SAI-254-80-656-LJ-VOL-2 ..... N82-11956 #

SAM-TR-81-15 ..... N82-11229 #

SAND-79-8279-VOL-1 ..... N82-11576 #
SAND-80-0451 ..... N82-11370 #
SAND-80-2438C ..... N82-11266 #
SAND-80-2689 ..... N82-11440 #
SAND-80-2690C ..... N82-11714 #
SAND-80-2870C ..... N82-11952 #
SAND-81-0022C ..... N82-11200 #
SAND-81-0070C ..... N82-11506 #
SAND-81-0270C ..... N82-11951 #
SAND-81-0275-REV ..... N82-11556 #
SAND-81-0295C ..... N82-11221 #
SAND-81-0369 ..... N82-11617 #
SAND-81-0566 ..... N82-11649 #
SAND-81-0617C ..... N82-11379 #
SAND-81-0672C ..... N82-11953 #
SAND-81-0755C ..... N82-11887 #
SAND-81-0850C ..... N82-11974 #
SAND-81-0937 ..... N82-11241 #
SAND-81-1041C ..... N82-11797 #
SAND-81-1079 ..... N82-11713 #
SAND-81-1087C ..... N82-11377 #
SAND-81-1194C ..... N82-11854 #
SAND-81-1335C ..... N82-11201 #
SAND-81-1353C ..... N82-11115 #
SAND-81-1546C ..... N82-11604 #
SAND-81-1553C ..... N82-11908 #
SAND-81-1589C ..... N82-11463 #
SAND-81-1718C ..... N82-11893 #
SAND-81-1782 ..... N82-11355 #
SAND-81-7014-VOL-1 ..... N82-11566 #
SAND-81-7014-VOL-2 ..... N82-11566 #
SAND-81-7014-VOL-3 ..... N82-11567 #
SAND-81-7014-VOL-4 ..... N82-11568 #
SAND-81-7014-VOL-5 ..... N82-11569 #
SAND-81-8177-EXEC-SUMM ..... N82-11570 #
SAND-81-8177-VOL-1 ..... N82-11564 #
SAND-81-8177-VOL-2 ..... N82-11565 #

SAPR-1 ..... N82-11696* #

SAR-2 ..... N82-12004* #

SCIENTIFIC-1 ..... N82-11870 #
SCIENTIFIC-2 ..... N82-11708 #
SCIENTIFIC-3 ..... N82-11438 #
SCIENTIFIC-3 ..... N82-11705 #
SCIENTIFIC-4 ..... N82-11638 #
SCIENTIFIC-5 ..... N82-11709 #
SCIENTIFIC-7 ..... N82-11711 #
SCIENTIFIC-14 ..... N82-11637 #

SC5266.1FR ..... N82-11961 #

SD-TR-81-56 ..... N82-11134 #

SER-76 ..... N82-11443 #
SER-489 ..... N82-11327 #

SERI/PR-0-9010-2 ..... N82-11557 #
SERI/PR-0-9010-3 ..... N82-11558 #
SERI/PR-8062-1-T12 ..... N82-11577 #
SERI/PR-9296-T1 ..... N82-11553 #

SERI/RR-641-615 ..... N82-11559 #

SERI/TP-611-1226 ..... N82-11597 #
SERI/TP-611-1231 ..... N82-11605 #
SERI/TP-613-1225 ..... N82-11610 #
SERI/TP-614-1216 ..... N82-11609 #
SERI/TP-614-1235 ..... N82-11608 #
SERI/TP-622-1174 ..... N82-11563 #
SERI/TP-623-1164 ..... N82-11607 #
SERI/TP-631-1254 ..... N82-11612 #
SERI/TP-632-1287 ..... N82-11606 #
SERI/TP-634-1195 ..... N82-11611 #

SERI/TR-332-416-VOL-2 ..... N82-11572 #
SERI/TR-8085-3-T1 ..... N82-11045 #
SERI/TR-98252-1B ..... N82-11325 #
SERI/TR-98288-1 ..... N82-11407 #

SIO-REF-81-18 ..... N82-11637 #

SLAC-PUB-2715 ..... N82-11972 #
SLAC-PUB-2768 ..... N82-11842 #

SOLAR/1041-81/14 ..... N82-11580 #
SOLAR/1045-80/14 ..... N82-11561 #

SR-6 ..... N82-11639 #

SRL-17 ..... N82-11092 #

SU-SUPRI-TR-25 ..... N82-11153 #

SU-TF-13 ..... N82-11396* #
SU-TF-14 ..... N82-11393* #
SU-TF-15 ..... N82-11394* #
SU-TF-16 ..... N82-11395* #

TDA-PR-42-65 ..... N82-11279* #

TES-32075-107 ..... N82-11562 #

TI-03-80-47 ..... N82-11367 #
TI-08-79-10 ..... N82-11363 #

TR-3 ..... N82-11187 #
TR-3 ..... N82-11934 #
TR-6 ..... N82-11483 #
TR-13 ..... N82-11964 #
TR-81-1-ONR ..... N82-11837 #
TR-81-2-ONR ..... N82-11836 #
TR-81-3-ONR ..... N82-11828 #
TR-81-8-ONR ..... N82-11835 #
TR-81-136-01 ..... N82-11678 #
TR-81-388200-4 ..... N82-11806 #
TR-230-2042 ..... N82-11040* #
TR-336 ..... N82-11837 #
TR-337 ..... N82-11836 #
TR-349 ..... N82-11835 #
TR-430 ..... N82-11828 #
TR-643 ..... N82-11482 #
TR-0081(6623)-2 ..... N82-11112 #
TR-0081(6950-01)-1 ..... N82-11134 #
TR-8101 ..... N82-11751 #

UCID-19076 ..... N82-11818 #
UCID-19097 ..... N82-11812 #

UCRL-TR-1596 ..... N82-11852 #

UCRL-15373 ..... N82-11915 #
UCRL-50026-81-1 ..... N82-11267 #
UCRL-50042-80 ..... N82-11647 #
UCRL-53121 ..... N82-11263 #
UCRL-84488-REV-1 ..... N82-11873 #
UCRL-84854 ..... N82-11938 #
UCRL-85175-REV-1 ..... N82-11460 #
UCRL-85274 ..... N82-11220 #
UCRL-85281 ..... N82-11916 #
UCRL-85365 ..... N82-11900 #
UCRL-85506 ..... N82-11899 #
UCRL-85539 ..... N82-11504 #
UCRL-85614 ..... N82-11264 #
UCRL-85669 ..... N82-11810 #
UCRL-85720 ..... N82-11898 #
UCRL-85721 ..... N82-11219 #
UCRL-85760 ..... N82-11378 #
UCRL-85852 ..... N82-11248 #
UCRL-85867 ..... N82-11940 #
UCRL-85883 ..... N82-11939 #
UCRL-86099 ..... N82-11505 #
UCRL-86259 ..... N82-11374 #
UCRL-86260 ..... N82-11247 #
UCRL-86267 ..... N82-11880 #
UCRL-86297 ..... N82-11596 #
UCRL-86437 ..... N82-11712 #
UCRL-86513 ..... N82-11917 #

UDR-TR-80-123 ..... N82-11496 #

UIEM-81-2 ..... N82-11343 #

UILU-ENG-81-2002 ..... N82-11327 #

UILU-81-2539 ..... N82-11343 #

UNH-SG-172 ..... N82-11751 #

UNIHI-SG-CR-81-04 ..... N82-11536 #

US-PATENT-APPL-SN-070366 ..... N82-11431*
US-PATENT-APPL-SN-092142 ..... N82-11206*
US-PATENT-APPL-SN-098568 ..... N82-11357*
US-PATENT-APPL-SN-119340 ..... N82-11432*
US-PATENT-APPL-SN-135040 ..... N82-11088*
US-PATENT-APPL-SN-145206 ..... N82-11336*
US-PATENT-APPL-SN-202228 ..... N82-11399* #
US-PATENT-APPL-SN-272839 ..... N82-11359* #
US-PATENT-APPL-SN-291644 ..... N82-11436* #
US-PATENT-APPL-SN-291645 ..... N82-11785* #
US-PATENT-APPL-SN-293414 ..... N82-11470* #
US-PATENT-APPL-SN-297487 ..... N82-11118* #
US-PATENT-APPL-SN-303670 ..... N82-11469* #
US-PATENT-APPL-SN-303672 ..... N82-11861* #
US-PATENT-APPL-SN-308204 ..... N82-11312* #
US-PATENT-APPL-SN-309293 ..... N82-11147* #
US-PATENT-APPL-SN-310713 ..... N82-11210* #
US-PATENT-APPL-SN-310714 ..... N82-11360* #
US-PATENT-APPL-SN-652979 ..... N82-11634*
US-PATENT-APPL-SN-691647 ..... N82-11770*
US-PATENT-APPL-SN-969759 ..... N82-11144*

US-PATENT-CLASS-73-147 ..... N82-11088*
US-PATENT-CLASS-110-234 ..... N82-11144*
US-PATENT-CLASS-110-245 ..... N82-11144*
US-PATENT-CLASS-110-255 ..... N82-11144*
US-PATENT-CLASS-110-266 ..... N82-11144*
US-PATENT-CLASS-122-4D N82-11144*
US-PATENT-CLASS-128-327 ..... N82-11770*
US-PATENT-CLASS-128-686 ..... N82-11770*
US-PATENT-CLASS-128-691 ..... N82-11770*
US-PATENT-CLASS-156.307.7 ..... N82-11206*
US-PATENT-CLASS-156-307.3 ..... N82-11206*
US-PATENT-CLASS-156-307.5 ..... N82-11206*
US-PATENT-CLASS-156-331.5 ..... N82-11206*
US-PATENT-CLASS-210-40 ..... N82-11634*
US-PATENT-CLASS-235-92PC N82-11431*
US-PATENT-CLASS-252-422 ..... N82-11634*
US-PATENT-CLASS-324-71CP N82-11431*
US-PATENT-CLASS-335-256 ..... N82-11357*
US-PATENT-CLASS-335-266 ..... N82-11357*
US-PATENT-CLASS-343-700MS N82-11336*
US-PATENT-CLASS-343-708 ..... N82-11336*
US-PATENT-CLASS-343-727 ..... N82-11336*
US-PATENT-CLASS-343-795 ..... N82-11336*
US-PATENT-CLASS-343-846 ..... N82-11336*

US-PATENT-CLASS-361-141 ..... N82-11357*
US-PATENT-CLASS-422-40 ..... N82-11432*
US-PATENT-CLASS-430-17 ..... N82-11432*
US-PATENT-CLASS-430-372 ..... N82-11432*
US-PATENT-CLASS-528-126 ..... N82-11206*
US-PATENT-CLASS-528-172 ..... N82-11206*
US-PATENT-CLASS-528-173 ..... N82-11206*
US-PATENT-CLASS-528-180 ..... N82-11206*
US-PATENT-CLASS-528-207 ..... N82-11206*
US-PATENT-CLASS-528-208 ..... N82-11206*
US-PATENT-CLASS-528-210 ..... N82-11206*
US-PATENT-CLASS-528-211 ..... N82-11206*
US-PATENT-CLASS-528-225 ..... N82-11206*
US-PATENT-CLASS-528-228 ..... N82-11206*
US-PATENT-CLASS-528-351 ..... N82-11206*
US-PATENT-CLASS-528-353 ..... N82-11206*

US-PATENT-4,209,393 ..... N82-11634*
US-PATENT-4,284,461 ..... N82-11206*
US-PATENT-4,286,209 ..... N82-11431*
US-PATENT-4,286,460 ..... N82-11088*
US-PATENT-4,287,152 ..... N82-11432*
US-PATENT-4,287,518 ..... N82-11336*
US-PATENT-4,287,838 ..... N82-11144*
US-PATENT-4,294,261 ..... N82-11770*
US-PATENT-4,295,111 ..... N82-11357*

USAAVRADCOM-TR-78-0012-F ..... N82-11517 #
USAAVRADCOM-TR-79-0270-1 ..... N82-11064 #
USAAVRADCOM-TR-79-0270-3 ..... N82-11065 #
USAAVRADCOM-TR-81-19-A ..... N82-11398* #

USGS-WRD-KY-80-1 ..... N82-11526 #

USGS-WRD-ME-80-1 ..... N82-11541 #

USGS-WRD-MI-80-1 ..... N82-11527 #

USGS-WRD-OH-80-2 ..... N82-11528 #

USGS-WRD-OR-79-1 ..... N82-11542 #

USGS-WRD-TN-79-1 ..... N82-11539 #

USGS/GD-81/004 ..... N82-11716 #

USGS/WRD/HD-80/001 ..... N82-11542 #
USGS/WRD/HD-80/008 ..... N82-11539 #
USGS/WRD/HD-80/037 ..... N82-11527 #
USGS/WRD/HD-80/044 ..... N82-11526 #
USGS/WRD/HD-81/038 ..... N82-11528 #
USGS/WRD/HD-81/042 ..... N82-11541 #

USGS/WRD/WRI-81-053 ..... N82-11534 #
USGS/WRD/WRI-81-054 ..... N82-11533 #

USGS/WRD/WRI/81-047 ..... N82-11734 #
USGS/WRD/WRI/81-056 ..... N82-11532 #
USGS/WRD/WRI/81-058 ..... N82-11529 #
USGS/WRD/WRI/81-059 ..... N82-11667 #
USGS/WRD/WRI/81-060 ..... N82-11531 #
USGS/WRD/WRI/81-063 ..... N82-11540 #
USGS/WRD/WRI/81-066 ..... N82-11543 #

USGS/WRI-80-33 ..... N82-11529 #
USGS/WRI-80-82 ..... N82-11540 #
USGS/WRI-80-85 ..... N82-11531 #
USGS/WRI-80-86 ..... N82-11734 #
USGS/WRI-80-90 ..... N82-11534 #
USGS/WRI-80-112 ..... N82-11667 #
USGS/WRI-80-117 ..... N82-11533 #
USGS/WRI-81-2 ..... N82-11543 #
USGS/WRI-81-21 ..... N82-11532 #

UTNL-R-0103 ..... N82-11976 #

UTRC/R80-915213-4 ..... N82-11403 #

UWFDM-408 ..... N82-11954 #

VHTRC-81-R48 ..... N82-11332 #

W-43424 ..... N82-11963 #

WES/MP/EL-81-4 ..... N82-11910 #

WES/MP/GL-81-5 ..... N82-11315 #

WES/TR/GL-81-6-1 ..... N82-11498 #
WES/TR/GL-81-6-2 ..... N82-11499 #
WES/TR/GL-81-6-3 ..... N82-11500 #

WRRI-92 ..... N82-11668 #

WSG-80-6 ..... N82-11754 #

W81-03727 ..... N82-11443 #
W81-03951 ..... N82-11668 #

Y-2227 ..... N82-11476 #

Y/DU-192 ..... N82-11150 #

☆U.S. GOVERNMENT PRINTING OFFICE: 1982-361-561:2001

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an "*" following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols "#" and "*", from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business
Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return